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A JOURNEY IN RASMUSSEN LAND: *A paper read at the Evening Meeting of the Society on 2 March 1936, by*

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UNTIL the year 1930 the stretch of coast between Angmagssalik and Scoresby Sound was less known than any other in Greenland. The part of this region lying north-east of Kangerdlugssuak Fjord which this paper is about was named after the late Dr. Knud Rasmussen, whose work and journeys are too well known to the Society to need further remark. His death in 1933 on returning from this same country was a sad blow to all who knew him or had read his delightful writings on the Eskimo, but most of all to the native people themselves to whom his death meant a loss which no one can ever replace.

It is laid down in the old Norse sailing directions that in order to reach the Greenland settlements near Cape Farewell one must steer from Iceland north-west until a great mountain is sighted standing in the middle of the sea. The mariner was then directed to hold his course until this mountain bore north, when he would steer south-west along the edge of the ice until he made his landfall in South Greenland. It is also written that, in clear weather, it is sometimes possible to see Hvitserk and Snaefell in Iceland at the same time. In all probability, then, since this part of the coast is the only one near enough to Iceland for such a phenomenon to be possible, the high mountains in Rasmussen Land are the legendary landmark of Hvitserk.

In historic times nothing was known of this coast until 1833, when Jules de Blosseville visited it in the *Lilleoise*. It is more than likely that he saw the high mountains, but as he and all with him disappeared, no record remains of his discoveries. In 1900 Lieutenant (now Admiral) Amdrup made his great boat journey from Scoresby Sound to Angmagssalik. Although this coast is about the worst in Greenland for dangerous ice and lack of shelter, he succeeded by sail and oar in reaching his objective. On the way Amdrup mapped the whole coastline with remarkable accuracy. A notable thing about this map is that no detail is drawn from inference or imagination. Only those features which were seen were put in; all others were left undrawn and unnamed. It was on this journey that the entrance to Kangerdlugssuak was

first seen, though there was in existence a remarkable map which an Eskimo had drawn for Gustav Holm whereon it was marked. Amdrup's little boat naturally had to hug the coast so that there was no opportunity of seeing the inland mountains. It is interesting to recall that it was on this journey that Captain Mikkelsen got his first introduction to the North which has led to such a long career of splendid work.

For thirty years this region remained untouched until in 1930, one of the objects of the British Arctic Air Route Expedition being to survey this coast, it was revisited. By the use of a small aeroplane and boat parties working from the *Quest* Watkins hoped to be able to map the country between the Inland Ice and the sea and to put in details of the fjords which Amdrup had not been able to visit. The most remarkable feature here is the fjord of Kangerdlugssuak. The *Quest* was the first ship to enter it and we had the good fortune to see for the first time the full extent of its beauty. While on a flight from near this fjord Watkins was astonished to see, far to the north-west, a great mountain wall striking up above the 7000-foot coastal peaks. He estimated its height at about 12,000 feet. Our plans did not allow us to make any further investigation of the range on that expedition, since it lay about 350 miles from our base, but many times we discussed how one day it might be reached. Watkins thought that it would be almost impossible to cross the intervening mountains between the range and the sea because, to do so, would require more food than could be carried and the country appeared too bad for sledging. There remained the alternatives of finding a route from the coast farther north or of sledging across the Ice Cap from the West Coast. This second plan Lindsay tried in 1934. After a long dog-sledge journey from Jakobshavn he sighted land on July 20. Later high mountains were seen which, from observations taken by Godfrey, who was one of the party, proved to be the same range as that sighted by Watkins four years before. The position and height of the range found by this expedition agreed closely with those determined by the Danish air survey the previous year.

After Watkins had made the discovery several expeditions were attracted to make further investigations into this country. Notably in 1932 and 1933 there were two Danish expeditions which had important results. The first was sent out by the Scoresby Sound Committee under the leadership of Captain Mikkelsen, while the second was led by Dr. Knud Rasmussen with the co-operation of the Danish Government. It was not the intention of either of these expeditions to penetrate inland, but to make a map of the interior as well as the coastal country by photographic methods. On these two expeditions a rapid method of photographic survey was employed which, begun by Mr. Spender working on the ground in 1932, was on the second expedition extended, under the superintendence of Captain Gabel-Jørgensen, to the air. Using the results of these expeditions the Danish Geodetic Institute, under Professor Nørlund, worked out a technique which has proved sufficiently accurate for the important survey of West Greenland. In the Danish method only oblique photographs are taken from the air. Thus a large area appears in each photograph which means that comparatively few flights have to be made. By arranging the lines of flight to intersect at convenient angles positions can be plotted stereographically with a minimum of control points.

In this survey no control was made away from the coast, although the area mapped stretched inland for more than 100 miles. This is in contrast to the method used by Britain. Here it is considered necessary to cover the whole country to be mapped with a complete system of overlapping photographs taken vertically downwards. It entails a very great amount of flying in proportion to the area surveyed and also requires ground parties to work over the whole country establishing a network of accurately fixed points and heights. To try out this method in a country entirely untrodden, where no fixed points existed, was an ambitious undertaking; however from our experience we can say that it was completely justified and we cannot praise too highly the work of Captain Gabel-Jørgensen and Mr. Michael Spender, who were mainly responsible for its execution. They returned to Copenhagen with nothing but a large number of plates and a few angles, but by means of the wonderful stereo-plotting machine (which unfortunately we do not possess in this country) they were able to produce such a good map that we, who walked through the country last summer, could find no fault in it, while our observations only served to confirm its accuracy.

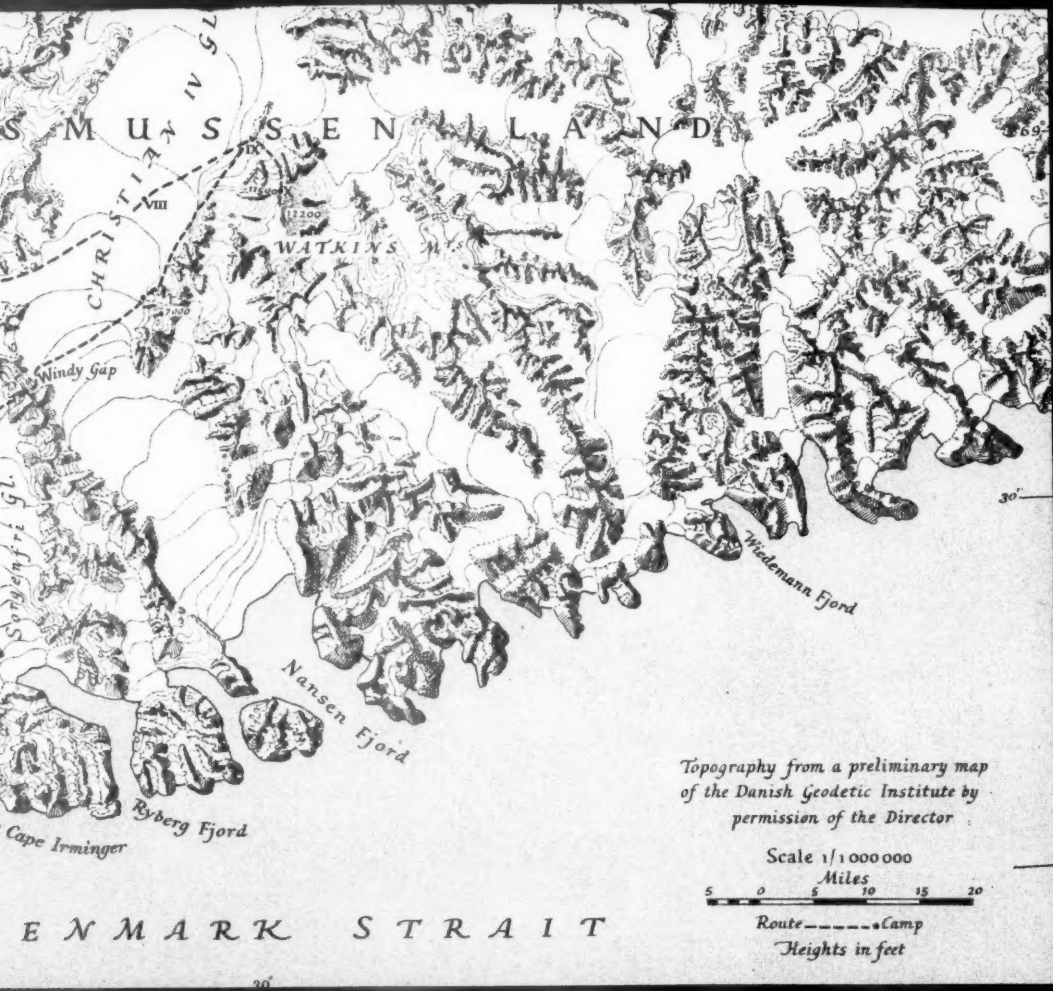
Lawrence Wager accompanied Mikkelsen's 1932 expedition and was able to visit Wiedemann's Fjord, where he took a sledge across the foot of a large glacier which led up towards the mountains. In 1933 he was busy climbing Mount Everest, but in 1934 he was invited by Dr. Charcot to join a party of Frenchmen in the *Pourquoi Pas?* who hoped to make a dash for the mountains on ski. On the voyage it was learnt that an Italian expedition was also on its way with the same objective. Neither party succeeded in making a landing from where their journeys could begin. He and I then planned to have a joint expedition. He was anxious to continue his geological work in the Kangerdlugssuak region, which would take a year, while together we hoped to make a summer journey to the New Mountains, which the Danes had now generously named after Watkins. Although we thought there was little chance of climbing the range, it seemed worth while to make a closer investigation of such a remarkable feature, to check the map, and to examine the geology, in addition to which there were very interesting problems of archaeology and Eskimo migration to be solved on the coast. For the Eskimo work we were fortunate in getting Mr. Helge Larsen to accompany us. In 1931 he had discovered the old settlement on Clavering Island, which is the biggest discovered in East Greenland and is named Dead Man's Bay. Last summer he was assisted in his excavations by Count Eigel Knuth, whose talents as an artist and great affection for the Eskimo produced some capital sketches of the people who were with us. Professor Nørlund kindly sent us preliminary copies of the new map and two complete sets of the air photographs from which it was made. From a study of these and from Wager's experience in 1932 we decided that we would if possible start our inland journey from Wiedemann's Fjord, where there is an ice-free anchorage, then by means of the glacier which comes down at its head try to work round to the north side of the range where it seemed easier to approach. The distance would be about 70 miles each way, so that if, as we thought, the inland country was too bad for sledges, only the lightest possible food and equipment could be carried. After some months of experimenting with equipment and

discussion of rations with eminent biochemists, we worked out an equipment which would enable us to do the required three weeks' journey, if necessary carrying everything on our backs. We kept the loads down to about 45 lbs. per man, which gave a sufficient allowance for survey instruments. We were very fortunate in being able to secure the *Quest* with her well-known master, Captain Schjelderup, in command. He had been of great service to us in 1930 and no better combination of ship and captain could be wished for in dealing with bad ice such as we might expect on the Blosseville Coast. The party consisted of Wager and his six companions for the winter, the two Danish archaeologists, Munck (another Dane) and four others. We made an experiment in taking ladies. Four of us wished to bring our wives, and their presence on board proved both pleasant and useful. I think I can safely say that the experiment was completely successful.

Having left Aberdeen on July 4 we encountered the pack on the 15th. The ice was close in on the coast and therefore tight. From the edge of the pack the mountains from Angmagssalik as far as Ingolfs Fjord could be seen clearly. Very soon we got into a tight belt of small floes with a large number of great icebergs around us. At one time we counted forty-three bergs in sight. Towards evening we lost manoeuvring power owing to the ice being pressed round the ship so closely that the propeller could not be moved. We could then only drift with the pack. Towards midnight a dangerous situation developed. The sea and sky were absolutely calm and except for a long swell there was no perceptible movement of ship or ice; but the tides were at the top of springs, and this, added to the southerly current which is strong hereabouts, was carrying the ice and us with it rapidly towards a line of bergs. We calculated the height of one of these with a sextant and it came to 216 feet. One very large and particularly unpleasant-looking specimen lay in our path. Dynamite was used to try and free the ship, but with no result. The ice closed in as fast as a hole was made. The captain descended from the masthead and said he could do no more, and that if we touched the berg with the swell prevailing the ship would be lost. All hands began to prepare to abandon ship. Provisions were broken out of the hold, but no tents could be found as most of our equipment was buried under many tons of coal and timber. The women rose to the occasion splendidly. They quickly got up all the personal gear and packed it ready on deck. The ice was all in such small pieces that it was not a pleasant thought to imagine ourselves trying to live on it. For a couple of hours we were most anxious, but after this we saw that the current was setting us round the berg, and presently we cleared it by a few yards. Soon however we were set towards another one, but missed it by about half a ship's length. While we lay stuck the following day a small figure suddenly appeared far away on the ice. Soon we were met by a flotilla of kayakmen who had seen us from the shore. Two of them came on board to pilot us (though we did not rely on their navigation) and by evening we were sounding our way in a thick fog to the anchorage behind Cape Dan.

The people living there were of the old-fashioned sort, so that we had the great delight of seeing them in the surroundings of many centuries ago living in their skin tents with the old stone lamps burning blubber. It was a contrast to arrive next day at the main settlement of Tasiusak, where we found that

KNUD RASM
Windy Ga
Black Cap
KANGERDLUGSSUAK
Amdrup Fj.
Skærgaard Peninsula
Milii Fj.
Cape Irmin
DEN
Cape Edward Holm


S M U S S E N L A N D
CHRISTIAN IV GL.
VIII
12200
WATKINS M.
Windy Gap
Spydenfri Gl.
Wiedemann Fjord
Nansen Fjord
Ryberg Fjord
Cape Irminger
E N M A R K S T R A I T
69°
30'
Topography from a preliminary map of the Danish Geodetic Institute by permission of the Director
Scale 1/1 000 000
Miles
5 0 5 10 15 20
Route ------ Camp
Heights in feet

civilization had made unfortunate progress in the past four years. Instead of two Europeans there were now eight and they were expecting six ships this summer instead of the single one that used to come. However it was most pleasant to see some of our old friends again and we were very hospitably entertained by the governor, Herr Rassow, the members of the French expedition, as well as by the native people. Here Wager had arranged to collect two Eskimo families and some dogs who were to winter with him in Kangerdlugssuak. The governor had chosen two of the finest hunters in the district from the many volunteers who wished to go, and Wager was greatly assisted by the Frenchmen who, the previous winter, had been living in close touch with the people. Their objects were the ethnological and physiological examination of the natives. They had stayed in every winter house in the district, sledged through the mountains as far as Lake Fjord, and examined every individual to a number of about eight hundred. During our stay we were entertained to a drum dance in the old meeting place above the village. These dances go back to the earliest history of the Eskimo. They were used as duels as well as to express joy, sorrow, or description of the hunt. In the duel the two contestants each in turn make a song of mockery about the other. No one is ever mentioned by name but only by inference. The man that brings the most public laughter on his opponent is the winner. We saw some of these contest dances and heard comic and hunting songs. All of them were done with great spirit and most realistic acting, but the words were in old Greenlandic, which they do not now understand.

It took some time to sort out all the various relations of the families who were to come with us. Wager did not wish to have any passengers among them and it was essential to have a right number both of good hunters and good sewing women. At last everything was arranged and the families of Enoch and Hansi were embarked together with all their children, dogs, skin tents, umiaks, and kayaks. Considering they were going for a year it was amazing what a small amount of luggage they took with them. All the same when we left to a great salute of guns we were a crowded ship. There were fourteen of ourselves, fourteen crew, fourteen Eskimo, and fourteen dogs. The natives lived in the hold on top of the coal, while on deck were the dogs, the house timber, the two large umiaks, and the hunters' kayaks. While we were at Tasiusak, Longland, Mrs. Longland, and Munck, a Danish member of the party, succeeded in making a second ascent of the fine-looking peak which overlooks the harbour.

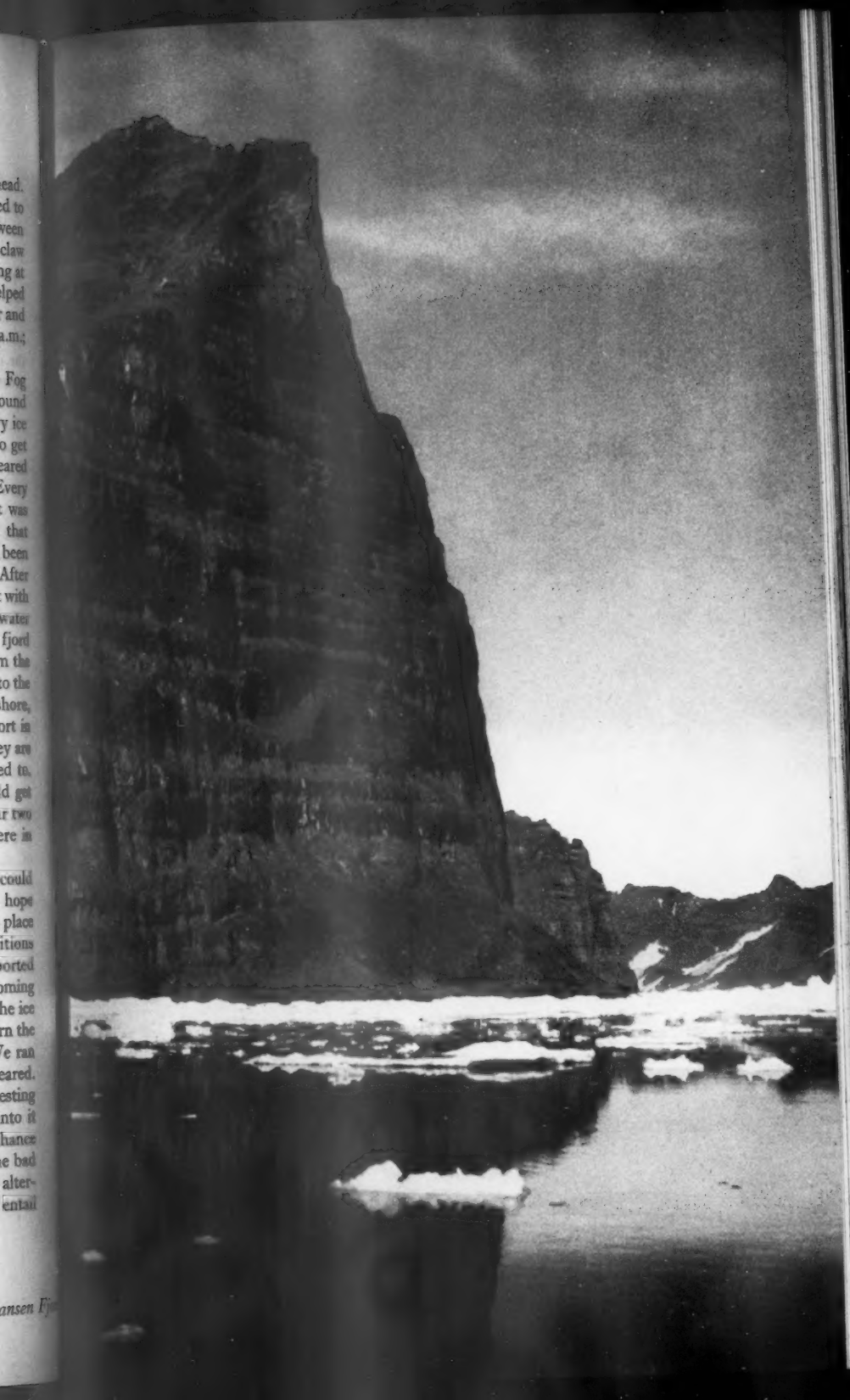
We had good conditions for two days, steaming north inside the islands until we reached the fjord of Sermiligak. There we came out on the open coast and found the ice very heavy and packed close in with no land water. Accordingly we were forced to shelter behind Leifs Island. The east side of the island opposite our anchorage presented such a forbidding appearance that the mountaineers were attracted to scale it. Two parties were made up for a practice climb which ascended the island by different routes. From the summit (2500 feet) we obtained a good view of the ice which seemed tight on the coast as far as we could see. However the following day we found a just possible way in-shore and by evening were anchored in Lake Fjord near the house used by Watkins' party on their last expedition. This fjord is remarkable

for having a small river running into it from a lake not far from its head. My wife and I took a boat down to the point where the cross was erected to Watkins in 1932. We found it standing securely on its rocky bluff between the two branches of the fjord facing out across the pack. There were the claw marks of a bear that had climbed up it to the top. Whilst we were looking at it one of our Eskimo came in his kayak. He had just killed a seal and he helped us put some stones round the foot of the cross. Nets were laid in the river and by midnight we had about thirty fine char (*salmo alpinus*). We sailed at 3 a.m.; the engine was stopped and the ensign dipped as we passed the point.

On leaving the fjord we made the mistake of hurrying too quickly. Fog came down but we steered on through the pack, so that when it cleared we found we had been carried about 12 miles out to sea by the current, with heavy ice all round us. For several days we tried by every means in our power to get the ship into the land water, but eventually came up against what appeared to be solid ice with no leads as far as we could see from the crow's nest. Every day the weather was perfect with blue sky, bright sun, and no wind. It was most disappointing to waste such weather stuck in the ice. It seemed that we had struck a bad ice year, for one day we heard that four sealers had been lost off Angmagssalik. Fortunately a fifth ship picked up the crews. After eight days of practically no movement, apart from our southerly drift with the current, the captain succeeded in working the ship into some land water and on August 2 we were close to the mouth of Kangerdlugssuak. The fjord was full of ice and bergs which did not appear to have broken out from the previous winter, and it took us two days to cross the mouth of the fjord to the anchorage of Skærgaards Halvø. We soon had the Eskimo and dogs ashore, which they were delighted to reach after three weeks of great discomfort in the ship. Eskimo are not happy if they have nothing to do or when they are forced to live under conditions different from what they are accustomed to. Now the men could go hunting in virgin waters while the women could get their tents into order and resume their way of life. Here we left also our two archaeologists to work on the old houses of the people who lived there in former times.

On leaving Kangerdlugssuak we found open land water in which we could go at full speed for the first time for several weeks. This led us all to hope that by the morrow we should reach Wiedemann's Fjord, the starting place for our inland journey. But, as so often happens in Greenland, conditions changed abruptly. At 3 a.m. I was awakened by the captain, who reported that it had suddenly come on to blow hard from the east and the ice was coming in fast. Owing to very heavy rain he had not been able to see far and the ice was upon us before he realized it was near. He only just managed to turn the ship in time before getting nipped between the pack and the cliffs. We ran back into the fjord behind Cape Irminger to shelter until the weather cleared. We were disappointed at this turn in our fortunes, though it was interesting to enter this fjord since there is no record of any one having been into it before. The season was now getting late and as there seemed to be no chance of getting north for some days we had to decide whether, in view of the bad ice conditions, we should get there in time to make our journey. The alternative was to try and find a route from where we were then, which would entail

Cliff near Nansen Fj



The

travelling a distance of 100 miles each way, the crossing of much complicated country and the King Christian IV Glacier. Wager considered that to adopt such a change would reduce our chances of reaching the mountains by half, but on the other hand there were strong reasons for it, the chief of which was that the ship would have a really safe anchorage within a short distance of her unloading place in Kangerdlugssuak. After a couple of hours' intense study of the air photographs there seemed a hope of the new plan being possible and a route being found, so Wager and his brother set off in a boat for a side glacier to examine the question of getting sledges up the first part of the way. The rest of the party unpacked the equipment, while the ladies sewed food bags and ski skins. The weather was very bad so that the prospecting party could not see anything off their own track, but on their returning they reported that the first 3 miles were rough but possible. We therefore decided to adopt the change of plan. The following day the ship was moved to an anchorage close to the glacier and the whole party as well as the crew started to carry loads up the steep moraine to a point on the glacier where the sledges could start. While we were doing this a message came from Wager that he had just discovered, by looking at the air photographs in a stereoscope, that there was a big drop between our glacier and the one it joined, which we were planning to ascend. He, Longland, and I immediately set off to prospect. It was misty and we could not see much. After about ten hours we got back to the ship, having found that the drop certainly did exist, but owing to the visibility we could not find any route down it. By this time all the gear was ready on the glacier, so we decided to start next day and see what happened. Accordingly on August 7 we set out. There were six men in the main party, three in the supporting party, and three members of the crew came to haul with us for the first few miles. On the two sledges we had enough food for four weeks on full rations. The surface was rough and hummocked as the bottoms of these glaciers always are in summer, but with the help of the great strength of our Norwegian crew we made good speed until we came to the limit of our previous day's prospecting. The mist stopped us from seeing our next stage, so we camped, having sent the crew back to the ship.

The main party consisted of Dr. Fountaine, and Messrs. Longland, L. R. and H. G. Wager, and myself. The supporters were Messrs. Chambers, Deer, and Hoeg, a member of the crew who had volunteered to come with us and had spent a winter in North-East Greenland trapping foxes. I was very content to be able to leave the leadership and route-finding of the journey in the hands of L. R. Wager, whose mountaineering judgment is second to none. It proved a good move to have started at the end of a bad spell of weather, for the next day broke fine and clear and remained almost continuously so for the remainder of the trip. A look at the foot of the Sorgenfri Glacier, which was the next stage of our route, showed that it would be quite impossible for sledges. It seemed to consist of nothing but a tumult of séracs from one side to the other. Accordingly on the second day we made for a pass which, from about 3300 feet would, we hoped, lead us on to the Sorgenfri at a point where travel on it would be possible. All that day we pulled up to the pass. The snow was soft and like a mixture of sand and glue. The last part of the ascent we had to double haul the sledges, nine men to each. From

The Watkins Range

the top of the pass Wager and I went off to prospect our next step. Climbing to the left through deep soft snow we reached a point where we could see south-west into Watkins Fjord in Kangerdlugssuak, while in the north-west rose the magnificent southern face of the Watkins Mountains. The wall of this range, whose top was in cloud, made a wonderful contrast to the sharp spires of the Kangerdlugssuak peaks, and Wager, who knows the Himalaya, thought it the most impressive mountain wall he had ever seen. The following day we continued our circuit of the lower end of the Sorgenfri. The snow was deep and crusted and the crust broke under the weight of the sledge and of each of our footsteps. Presently we came to a place where there was a steep drop of 1000 feet. We had to lower the sledges with a rope belayed to several ice axes, but it was as much as the whole party could do to hold one of them. That night we found a small outcrop of rock to camp on, which was a pleasant change from the snow. From what we could see of the Sorgenfri Glacier from this point it was still in a very bad state, so we decided to make a further detour. Accordingly we pulled up next day to a pass of about 4000 feet under the fine peak we called Black Cap. The last part was steep, but with nine men to a sledge we found we could manage it by a succession of short hauls.

After we had made camp on the top of the pass the clouds lifted and we saw our mountains completely for the first time, towering in the evening sun above all their surroundings, although they were still over 40 miles away. It froze hard in the night, which enabled us at five next morning to run the sledges down the other side of the pass without difficulty. There we joined the Sorgenfri Glacier at a point immediately below a formidable ice-fall full of crevasses. On reaching the junction with this glacier, which seemed hardly to deserve its name, meaning "Sorrow Free," Wager and Longland went off to find a route through the crevasses. They reported that they thought it was possible but great care would be required. However the hot sun was rapidly spoiling the snow bridges, and when we got one sledge about half-way up we found that it was too risky to go on. Camp was made and the remainder of the day spent in dividing up the gear so that the supporting party could return the following day with all that was not absolutely necessary. Our next step depended on a frost that would strengthen the snow bridges. At 11 p.m. a föhn wind was blowing down the glacier which, causing a temperature of 32°, made it too warm to be safe. At 2.30 a.m. it was still unsafe for the laden sledges so we portaged the loads through the remainder of the crevasses, all the party being roped. We got through to the level upper glacier without mishap, and then sent the supporting party back with one of the sledges. It was hard luck for them, now that most of the heavy pulling was over, to have to return, but it was necessary that the main party should have the maximum amount of food per man in case we got held up later on. We put on skis and all the rest of the day had fast travelling on a good surface which slowly gained height. In the afternoon we were on a sort of wide snow plateau which appeared to join the Inland Ice. To the north-west rose a fine pointed peak which we later identified as Lemon's Bjerg. A typical ice-cap wind was blowing with fine drift. By 4 p.m. the surface had started to get soft, so we camped at a height of about 6000 feet. This day we did 15 miles, about three times the previous

best distance, which was due to the greatly improved surface. We now had to find a way down to the huge King Christian IV Glacier which lay, a 12-mile-broad river of ice, between us and our mountains. We knew it was 2000 feet lower than we were, so we expected difficulty in reaching it. Starting at 2 a.m., the not-yet-risen sun touching the peaks with crimson, we carried on uphill for about four hours, when we found a depression falling away on our left. We stopped the sledge and set out on ski to investigate. It soon appeared that our plateau dropped in an unpleasant-looking glacier which led down to the lip of an ice-fall. Every 100 yards on this glacier there was a broad transverse crevasse. We skied on to the edge of the ice-fall to find a way down. As we came to the lip the whole range of our mountains burst above the snow-line. Below and in front of us lay the shining white King Christian Glacier and beyond it shot up the 7000-foot southern wall of the range itself topped with three snow summits. The face of the massif was banded horizontally by the snow in alternate black and white layers which showed up the fine black basalt formation. The ice-fall appeared formidable, but we hoped to manage it provided the crevasses were not too bad at the bottom. While the sledge was being cautiously lowered down the first part of the ice-fall three of us ascended a snow dome to take observations. At the top we found ourselves at a height of about 7300 feet with a splendid view of the whole surrounding country. To the west and south-west the tall sharp peaks round the head of Kangerdlugssuak showed themselves, while to the east, across the great glacier, rose the Watkins Range, and to the north-west the glacier gradually spread out until it became merged in the Inland Ice. We took the sun at noon for latitude and observed the angles of all the prominent peaks, although we were much troubled by the intense glare on the level snow surface of the dome since it is not possible to use a small theodolite with snow glasses. On descending from the dome we found that after the sledge had got down the first steep part of the ice-fall it had become involved in a very complicated system of wide and deep crevasses. While camp was made Longland went on to prospect a way through them. He succeeded in finding a tortuous route for part of the way, and taking advantage of the night frost we started with the sledge at 1 a.m. This was the most critical part of the route, for if it became impassable here we should have great difficulty in finding an alternative. However by a most involved and slender route we got down the ice-fall at last, though we had difficulty at times to keep the sledge from slipping off the narrow bridges and divisions between the crevasses. By 9 a.m. we had reached the junction with the great glacier. We landed here on a rocky point where Wager found some pieces of coal and some fine impressions of fossil plants. One of our main fears had been that this glacier, on account of its great size, would have crevasses which were too big to be crossed. This was the chief reason for our original choice of a route farther north so that we should not have to cross it. It is probably one of the largest true glaciers in the world, since it runs between mountain walls for about 110 miles and is from 7–15 miles wide. However we found that our doubts were needless. The glacier turned out to be both smooth and level. There were no crevasses visible, but only lakes which were all frozen over so that they did not impede us. The only thing which worried us was the excessive glare from the level

expanse of snow. Our lips especially became in very bad condition so that we had difficulty in eating our salt pemmican. Only the best quality snow glasses were good enough to protect our eyes, and some who wore celluloid goggles were troubled with slight snow blindness, and unfortunately we had not brought any of the special ointment necessary to protect the skin. We camped in the middle of the glacier and the next day completed our oblique crossing when we reached a little lake beneath a rocky ridge detached from the main range. We were now, at a height of about 4900 feet, within striking distance of the summit, but owing to the clouds being down could not decide our next move for the present. The plan was, if the ascent looked difficult, for the experts to tackle it, leaving the uninitiated in peace at the bottom. We proceeded to make up five days' food on reduced rations into bags we had brought for the purpose. In the meantime Wager inspected the local rocks on which he found a caterpillar living on an Iceland poppy, both of which he brought back alive. That night on looking out of our tent we found that the clouds had lifted. The full moon hung straight above our mountain, which we could see almost to the summit, from which a fine glacier descended steeply towards us in a series of snow terraces. It was a beautiful sight, but dispelled any hopes the less high-minded of us might have had that we should be able to stay at the bottom to watch the climbers.

At 2 a.m., when we intended to start, a föhn wind was rattling the tent, but by 4.20 we were away on skis and making for the foot of the northern glacier which descended from the mountain within a mile of our camp. Later we roped in two parties. Most of the way we could wear ski with skins, but when it got too steep we had to tow them on strings. Of the weariness of that ascent I can say nothing of interest; nor am I competent to speak of the technicalities, but these are to be dealt with in the *Alpine Journal*. About noon we had reached a height of about 9500 feet, where we left our two light tents and our provisions. As we approached the summit the day was getting late, so Wager, forcing the pace, attempted the final pitch up a steep ice-face. The ice proved too tough for cutting steps so we were forced to retreat, but Longland seeing this set off to the foot of the ridge which, after a steep piece of step-cutting, brought us to the top at five-thirty. The sun was getting low but just sufficed for our photographs and observations. Fountaine, after considerable difficulty on account of the wind and temperature (5° F.), succeeded in boiling three thermometers in a rucksack. The three aneroids were read and an azimuth of the sun and a round of angles were taken with the theodolite. Munck hoisted the Danish flag to a ski-stick; a gesture we all welcomed, since our position, about 12,200 feet, was probably the highest point in Danish territory.

As we slowly worked our way down the summit ridge the sun set, leaving in the north-west a sky of green and orange. The air was now completely still while the shadow of the earth came overhead like an azure shutter, turning the shadows to a deep blue against the pale snow. We got down to our camp at nine. The following day half the party descended to the lake at the foot of the mountain, while the remaining three scrambled up a nearby peak of about 11,500 feet to collect specimens and take observations. We took the sun at noon at the foot of a rocky summit and on the top got a round of angles under

Looking W. from summit of Watkins Mountains

Watkins Mountains and King Christian IV Glacier, from Seafall Pass

The Screen Range from east side of King Christian Glacier

Watering ship in heavy pack

Camp IX at the lake of the Ivory Gulls

better conditions than those we had got the day before. The sharpness of the summit however made observation somewhat difficult owing to the small space, almost all of which was required for the instrument itself. Wager did some geology while his brother collected some lichens of strange colours. We then had a long and tiresome descent to the foot of the mountain, since most of the slopes were too steep for us to run on ski. When, late in the evening, we reached the little frozen lake where our tents lay, three pure white Ivory Gulls came and flew round us. After a little while they settled on the rocks close by, but afterwards we did not see them again. It was strange to see these mysterious silent birds so far from their native sea. Afterwards we called the place the Ivory Gulls.

We now had ten days in hand with which to make our way back to the coast. This was more than enough so that we had to decide what to do with it. There was not time to make any major journey, but we wished to see something more of the Watkins Mountains before we returned. We should have liked to make a pilgrimage round the whole range but, on looking at the air photographs, we discovered that there was a very big ice-fall on the south-west side which could not be avoided, while to the south and south-east the country was very broken. Since we wished to bring back our sledge we had to content ourselves with an unambitious detour to examine the great southern wall of the range. By this route we should avoid the ice-fall which had troubled us on our outward journey. Accordingly we sledged next day down the east side of the King Christian Glacier as far as a point where we could climb a peak in a subsidiary range to see over. The following day while the Wagers went to examine the sedimentary beds at the side of the glacier, three of us ascended to a point about 2600 feet above our camp. Using crampons up a steep snow slope we soon reached a summit, and after following the ridge through a second top came to a third which gave us a fine view of the great southern face of the main range. We got a noon sight for latitude, a round of angles, and some vertical observations on to the main summit. Although we were in an exposed position at 7000 feet the sun was so warm that it was most pleasant to sit on the top. Looking back across the big glacier we could see a pass which would lead us homeward by a much easier route than the one we had come by. When we returned to camp we found that Wager had found several plants and a moth on the lower slopes.

We started back the next day, crossing the King Christian Glacier in about six hours. After leaving a dump of all spare provisions for Wager's future use on the farther shore and having taken the sun we ascended the pass we had seen the day before. The ascent proved a heavy pull, and in fact the last part was as much as the six of us could manage, even with our lightly loaded sledge. On the top we found a strong wind pouring over, so we quickly descended some distance down the farther side for shelter. Right ahead stood the fine peak of Black Cap above Camp IV, a welcome landmark on our homeward way. In the morning two of us returned to the top of the pass for observations, but it was still blowing too hard to set up the instrument. From this point we had to find a way down to the Sorgenfri Glacier and cross it to join our outward route just below where the supporting party had turned back. All went well until nearly at the bottom of our descent from Windy Gap,

Camp IX at the lake of the Ivory Gulls

Watering ship in heavy pack

when we got into a species of glacier ice known to mountaineers as "dry." It consisted entirely of sharp ridges with deep ditches and holes full of water. The sledge had a rough time being hauled across such ice, but after a few hours we reached more level glacier and by evening pulled up to our old Camp IV. Leaving here all we could spare we reached the fjord next day (August 22) in fifteen hours. Below 4000 feet we again found the snow conditions heavy even for sledging downhill, while the lower part of the glacier had thawed into the trench and ridge or "dry" formation which made the last part of our journey slow and tedious. The *Quest* had arrived half an hour before us, so that in the end everything was entirely satisfactory.

While we had been away the ship had been engaged in unloading the winter stores at Skærgaards Halvø. Having completed this she returned to Irminger Fjord with the archaeologists, who were shown some sites of old Eskimo houses which my wife and the captain had found. Since Larsen wished to dig at these houses for some days we employed the time in taking the ship northward as far as Kivioq Fjord for Wager to examine the geology. On the way we met several bears which we succeeded in approaching closely for photographs. We anchored for the dark hours the first night under a high cliff and the second we spent in Nansen Fjord. On the way back a boat party was left in Rydberg Fjord to do geology. After a day at Irminger Fjord spent taking astronomical observations we sailed for Kangerdlugssuak, picking up the archaeologists at Cape Irminger. They had done some exceedingly good work, having in the space of three weeks collected over fifteen hundred specimens. We had good ice conditions and arrived at Skærgaards Halvø to find that Chambers and Deer had almost finished the winter house. The Eskimo were in excellent humour, having already killed thirty-two seals, a bear, and a narwhal. On visiting their tent we found them installed in great comfort surrounded by an immense quantity of food. All the dogs were fit and well fed and the children were as happy as ever. Two of them we found playing contentedly by a little pool. We hoped to be able to make a trip up the fjord to see what it was like this year, but next day a strong föhn wind was blowing down it, although at the anchorage in Skærgaards Halvø there was calm. We had therefore to return. In the afternoon the wind dropped a little outside, so we steamed out. We soon got into very bad ice, for it seemed that the winter ice had not broken out of the fjord and was holding in it all the bergs that normally would have drifted out to sea. After getting a few miles beyond Amdrup Fjord, on the west side, we found that it was impossible to continue, and indeed our position was threatened at the turn of the tide by a number of bergs pressing us on to the shore. We succeeded in landing a dump for Wager and then extricated ourselves as soon as possible, since it was already dark. We moored to a floe for the night. The next morning we returned to Skærgaards Halvø and, having landed the winter party, put to sea. It was very calm, so that in view of this and our experience earlier in the summer we expected to find heavy ice farther out. We were however delighted to find that, once clear of the Kangerdlugssuak ice and the bergs off Cape Edward Holm, the water got more open the farther we got out.

In such peaceful conditions the evening was one of rare beauty even for

Ruin of house on Skærgaards Halvø

Back of the same ruin

Greenland. To give any idea of it I must quote my diary, though no words can convey such things: "At sunset the lights were most beautiful. All the floes became a very pale rose while the water between was the palest green. To the west was the dark line of the coast mountains, the sky yellow and gold behind. The air was quite still with no sound." We had perfect conditions all the next day. It was so calm that we were sure there must be heavy ice farther out. During the day, as the coastal mountains sank below the horizon, the Watkins Range climbed up out of the sea until by evening we could make out all the high tops. Again we watched a perfect Greenland sunset: the sea, the ice, and the distant mountains all became coloured with the most delicate shades of mauve, pink, primrose and green. In the twilight mirage changed the distant icebergs into all the fantastic shapes so well known to travellers in these parts. By next morning we had passed the magic ring into the fog and grey sky of the North Atlantic. Having picked up a message that a sealer fishing for shark and halibut was short of provisions, we arranged to meet her by steering on a wireless bearing. She turned out to be the *Signalhorn* in which Dr. Humphreys' expedition went north the year before. We were pleased to give her sealmeat and flour in exchange for fresh halibut. After an unusually fine-weather passage we reached Aberdeen on September 9.

In giving the account of a journey of this sort it is sometimes forgotten that its success depends entirely upon the ship. This was especially true last year when the ice was unusually heavy and of exceptionally hard consistency. If the ship is not strong and handy, and if the captain and crew are not both willing and skilful, the objects of the journey cannot be attained. This year the *Quest* was the only ship to get in to the Blosseville Coast, and it should be realized that this was entirely due to her staunchness, to the skill and perseverance of her captain, and to the willingness and hard work of her crew. It only remains to add that if anything worth while was achieved on our inland journey the credit should be given to L. R. Wager, whose skill as a mountaineer and whose eye for country guided our party without mishap to its objective.

In conclusion I should like to express our warm thanks to all who have helped us, and most particularly to Professor Dodds, Professor Drummond, Dr. Daugaard Jensen, Captain Ejnar Mikkelsen, Professor Nørlund, and Dr. Zilva, while of course we are as always indebted to the Secretary and officers of this Society.

APPENDIX: NOTES ON SOME TECHNICAL MATTERS CONNECTED WITH THE INLAND JOURNEY

SURVEY: In view of the existence of the complete and detailed Danish map made from air photographs it would have been useless to attempt any mapping in the ordinary sense. Professor Nørlund had however asked us to check the map wherever we could and had supplied us with some of the air photographs pricked at points to which he would like angles observed.

Since we planned to back-pack all our equipment, only the lightest and fewest instruments were taken. These included a 3-inch vernier theodolite which had been made specially light for one of the Mount Everest expeditions, three good aneroids, and a specially made light hypsometer with three thermometers designed for us by Mr. Flower. As we could not carry the weight of a wireless

rthern slopes of Watkins Range

receiver we did not attempt to find the longitude. All these instruments worked well. The only disadvantages were (1) that the theodolite had a separate magnifier for the vernier which had to be held in the hand, which made it tedious to work with in daylight and practically impossible at night; and (2) that the hypsometer refused to boil when the air temperature was low unless placed in some container, *e.g.* a rucksack. With this equipment the only work which we found possible was (1) the determination of latitudes by circum-meridian altitudes of the sun at places which could be identified on the map; (2) the observation of some rounds of angles from prominent positions; and (3) some aneroid and hypsometer heights. We were fortunate in securing such a light instrument, as we should not have taken a heavier one to the higher points. Apart from the above, an azimuth of the sun was observed from the summit of the Watkins Range, and after our return to the coast latitude and longitude observations were taken in Irminger Fjord (Jacobsen's), using the ship's chronometer and wireless. The low accuracy of the instrument (about $\frac{1}{2}'$) was to some extent compensated by taking a large number of readings.

The following were the positions obtained:

Place	*Latitude*	*Longitude*	
Snow Dome	68° 47′ 03″		
Lichen Peak	68 55 59		
Peak in Screen Range ..	68 45 53		
Dump Point	68 41 58	By Sun W.	By Sun E.
Irminger Fjord (Jacobsen's)	68 11 52	31° 02′ 20″	31° 02′ 28″

The horizontal angles, which would be of no interest here, have been sent to the Geodetic Institute, Copenhagen. The heights were worked out by Dr. Loewe, of the Scott Polar Research Institute, using the pressure readings from aneroids and hypsometer at the upper stations correlated to the lower station readings at sea-level (Kangerdlugssuak) obtained from a barograph checked three times a day by mercury barometer. Like the latitudes, these agree closely with the Geodetic Institute map. The only one of interest to mention here is that of the summit of the Watkins Mountains. At this point the three aneroids read 18·38, 18·95, and 18·86 inches. The air temperature was 5° F. The boiling points of the three thermometers were 189·0, 189·2, and 189·2° F. At the lower station, about 100 miles distant and 48 feet above sea-level, the barometer stood at 30·08 inches, temperature 42° F. From these data and applying the instrumental corrections Dr. Loewe deduces the height of the summit as 12,200 feet. This agrees closely with the Danish figure taken from the map of 3700 metres (12,140 feet).

EQUIPMENT: Much thought and experiment was given to the equipment, since it was essential, if we were to carry our loads, to save every ounce. Eventually however little change was made in that used by Wordie and Watkins for summer journeys, though we got some good tips from Marco Pallis. The most important thing was the sledges, which were the ordinary Nansen pattern with polished metal runners (Albata metal). We came to the conclusion that even for light loads it is better to keep to the full-length 11-foot sledge. The man-harnesses were made by Messrs. Camp and Sports from a set of Shackleton pattern lent by Dr. Longstaff, and proved satisfactory in most cases. One or two men felt some sickness and discomfort from the pressure on the stomach after a long spell of pulling. More attention should have been given to the individual fit.

Skis were a last-minute suggestion by Longland, and proved most valuable. They were, with the exception of one pair, cheap ash ski, and for hauling were

superior to the one pair of expensive hickory ski that we had. Having more friction they do not slip back on hills, where the hickory cannot be used at all without skins. For steep hills we used artificial skins, which were excellent, and did not slip back even when the slope was as steep as the foot would bend back to. We had not thought that it was possible to pull strongly on ski, but we found hauling to be perfectly satisfactory although none of us was an expert.

Tents were the ordinary wall or cottage shape (Mummery tent), made of specially light sleeping-bag material (Kampette) with sleeve opening and groundsheet. For support we used light telescopic aluminium poles or ski sticks sewn in. The weight of tent complete with poles was $4\frac{3}{4}$ lbs (size 6 feet × 4 × 3 high).

Sleeping-bags were specially light double down, and a small blanket (2 × 3 feet) was provided to lie on and take the condensation, which it did very well.

Cooking gear was the subject of some fuel-consumption experiments, which showed that in this respect the ordinary Primus burning paraffin is superior to both the petrol Primus and the methylated spirit stove. For very short journeys, where the weight of the stove is more important than the fuel, the methylated might be better.

RATIONS: Owing to the kind interest of such eminent men as Professor Dodds, of the Biochemical Institute, Middlesex Hospital; Professor Drummond, of the University of London; and Dr. Zilva, of the Lister Institute, we were able to discuss very fully the question of the lightest possible ration. To this end some of us submitted to tests for metabolic rate. We wished if possible to get a daily ration invented which would weigh not more than about 1 lb. This we were told was quite impossible, but we knew from experience that something not much more than this could be used in an emergency. When we decided on taking sledges we arranged a double ration, which would give an ample quantity of high-quality food so long as the sledges could be kept going, and could then be cut down by one-third to 18 ozs. when we were forced to carry our loads. The ration was as follows:

	Full	*Reduced*
Bovril pemmican	6·0	5·3 oz./day
New Zealand butter in tins	4·0	2·7
Huntley and Palmer's Expedition Biscuits	2·8	1·8
Lump sugar	4·8	3·9
Bemax Chocolate, Milk and Plain (with wheat germ)	6·0	5·0
Full Cream Cheese (Silver Bud) in foil	3·3	2·0
Fortnum and Mason's Dried Vegetables (Julienne)	0·8	—
	27·7	20·7

In addition vitamin C tablets (Redoxon: Roche Laboratories, 51, Bowes Road, London, N.13) were taken every two or three days, and each pair of men was supplied with luxuries to the extent of 2 lbs. of oats and 1 lb. of sweets, which were to be consumed as desired and abandoned when necessary. Everything in the reduced ration could be eaten uncooked if weight of stoves, fuel, and cooking gear had to be saved.

PACKING: Extra light sledge boxes (Luralda three-ply) were made to fit the sledge: these were just sufficiently strong for the journey. This saved considerable weight. Each box held two men's food for ten days. A second box was taken for each tent to hold cooking gear, tent, rope, etc. A further box held the instruments, medical supplies, and so on.

EQUIPMENT:

General

2 sledges
8 ration boxes } to last 4 weeks
8 quarts paraffin }
3 small Primus stoves
3 tents
Climbing rope (2 × 80 feet)
,, line (2 × 120 feet)
Lash line
3 ice pitons
6 pair crampons
3 pots and lifters (Camp and Sports)
6 aluminium mugs
6 spoons
2 groundsheets (for covering sledges)
1 tin matches (waterproof)
6 man-harnesses
String
Copper wire
2 pulley blocks
Screwdriver
Pliers
Lantern and candles

Personal (including clothes in wear)

1 double sleeping-bag for each man
1 rucksack
1 ice axe
1 pair climbing boots
1 pair crampons
1 pair ski
1 pair ski sticks
1 pair ski skins
3 pairs light wool socks
2 pairs outer wool socks
1 pair stockings
1 pair short puttees
2 pairs flannel trousers
2 pairs wool pants (short)
2 wool vests
2 shirts
3 light Shetland sweaters
1 pair windproofs
1 pair snow goggles, orange and grey (Camp and Sports)
1 wool Balaclava helmet
1 pair outer gloves (horsehide and canvas)
1 pair inner gloves (wool)
1 pair mittens
1 knife
Matches (in lever lid tin)
1 book
1 wool mat
Bromo

Instruments

1 theodolite
3 aneroids
1 hypsometer and 3 thermometers
2 dry compasses
2 min. thermometers
3 small cameras
Nautical Almanac pages
Paper
Pencils
2 spare goggles
Medical outfit

DISCUSSION

Before the paper the PRESIDENT (Major-General Sir PERCY COX) said: I am not going to introduce Augustine Courtauld to you because all Fellows of this Society and their friends know all about him. I will however briefly recall his exploring record lest some of those present have not it in mind.

He is going to describe to us to-night his fourth expedition to Greenland. He has been for the last ten years exploring, that is, since he first went, as an undergraduate, with Mr. Wordie on the Cambridge Expedition to East Greenland in 1926. In the following year he went with Francis Rodd to the Aïr region in North Africa. Then he went again with Mr. Wordie to East Greenland, and next joined the British Arctic Air Route Expedition led by Gino Watkins. You will remember that it was on that expedition that he performed that, to me,

astonishing feat of passing five months in solitary confinement, latterly in the dark, without oil with which to cook anything, and with his sleeping-bag gradually freezing up from the feet. It was the most marvellous feat of solitary endurance that I know, and it will always remain in my memory, together with that terrible photograph of him taken when he emerged with the beard he had grown. I shall never forget that, especially because I once returned to civilization with a beard, though not under quite the same conditions. I had been on a three months' expedition in Oman and the terrible beard that I returned with nearly cost me my place with my wife. I have never since worn a beard, and I hope never to see Augustine Courtauld wearing one again.

It is a great pleasure to welcome him again on our platform to-night. Two of his party are in London. One is Mr. Helge Larsen, a Danish archaeologist, and curator of the Archaeological Museum in Copenhagen, who was good enough to join the expedition and was a great help to them in dealing with the Eskimos. I hope when Augustine Courtauld has finished his lecture Mr. Larsen will tell us something about the Eskimo antiquities that he has been studying. His other comrade, Mr. Longland, is prevented, I am sorry to say, from being present owing to a recent attack of influenza.

This is the first occasion, I think, on which wives have gone to Greenland with their exploring husbands. There were four ladies with the expedition, and Mr. Courtauld has told us that the departure was quite a success as an experiment, and that the ladies were both charming and useful. I am sure they were. But in what he is going to tell us to-night there is not much about the ladies' share in the expedition, which you will find was by no means a picnic. I am sure that, if possible, we shall wish to hear a little more on the spindle side of the expedition: how the ladies fared and passed their time. At any rate, you will realize from what Mr. Courtauld is going to say that they had some anxious and worrying times during the course of the expedition. I now ask Mr. Courtauld to deliver his lecture.

Mr. Courtauld then delivered the lecture printed above, and a discussion followed.

Mr. HELGE LARSEN: When Mr. Courtauld asked me to come and put the archaeological results of this expedition before the Fellows of the Royal Geographical Society, it was with some hesitation I consented to do so. The fact is that the material is far from being worked up, and before a careful examination of the specimens has been done it is impossible to give the final results of the investigations. These will occur in the Danish periodical *Meddelelser om Grønland*. Meanwhile, what I can do now is to give my observations from the field-work and out of them draw some conclusions regarding the history of the Kangerdlugssuak Eskimo.

Before I enter upon a description of the excavations I must say a few words about what was formerly known about the Eskimo in this area. Nobody has ever seen them. The Angmagssalik Eskimo knew that people were living in the big ice-filled fjord to the north, but they had not seen them. When the Danish naval officer Gustav Holm in 1884 came as the first white man to Angmagssalik he was told a story about an elderly man's father living in Northern Aputiteq just south of the mouth of Kangerdlugssuak, who had once travelled by sledge from his settlement into Kangerdlugssuak. There he came to a house the inhabitants of which had recently left it by sledge. He went into the house and tired with the journey he lay down to sleep. During the night he was stabbed in his leg with a knife, and he was so frightened that he hastened back to Northern Aputiteq without seeing the man who had carried the knife. If the story tells the truth the event must have taken place in the beginning of the nineteenth

century, and from an archaeological point of view there is nothing against the fact that Kangerdlugssuak was populated a hundred years ago.

For further information regarding the Kangerdlugssuak Eskimo we must turn to archaeology. In this respect the Kangerdlugssuak area is by no means a new land. In 1900 the Danish Admiral C. G. Amdrup visited the main fjord and discovered an Eskimo settlement on Skærgaards Halvø. Time did not permit him to do much digging, but he found in three graves a number of specimens of extremely good workmanship. In 1932 the Scoresby Sound Committee's second East Greenland Expedition excavated some houses in Miki Fjord and on Skærgaards Halvø. Here too the grave-finds formed the main part of the results as more than one-half of the specimens belonged to a single grave-find, the best ever made in Greenland. Taking this into consideration I considered it as my task to dig out as many house ruins as possible, and, if I got the chance, to investigate Irminger Fjord,[1] in which no white man had ever been.

On August 4 my assistant, Count Eigel Knuth, and I were landed on Skærgaards Halvø near the mouth of Kangerdlugssuak. On this peninsula are two Eskimo settlements: a large one with eight ruins on the south coast and, near the base of the peninsula, a smaller one only consisting of two ruins, both emptied by the 1932 expedition. The first-named was the one visited by Admiral Amdrup, but, as I have said, he did not do much digging, and when a sample excavation gave good promises we decided to begin here, and we were not disappointed.

As you will see on the screen the houses are lying rather a long distance from each other and from the sea. The height above sea-level is also considerable. The houses were of two types, namely, large oblong common houses with their greatest dimension at right angles to the passage-way, as we know them from Angmagssalik and West Greenland; and small rectangular or square houses. The occurrence of the large houses is of special interest, as it is the first time this type has been found so far north.

If we compare the two types of houses it is quite easy to see that the large oblong house in the foreground must be the older. It is nearly flattened out and there are hardly any stones left in the walls. I consider that the stones were removed and used for the house lying just in front of the other, and this represents the second type. While the house first mentioned measures about 3 m. (10 feet) from front to back wall and about 7 m. (23 feet) from one side wall to the other, this house only measures 3 m. by 2 m. (10 feet by 7 feet). This house is extremely well preserved. The walls undoubtedly have nearly the same height as when the house was inhabited, namely, 1·4 m. (5 feet) above the floor-stones. The passage-way is likewise intact: it is 3·5 m. (12 feet) long, of which the innermost half is covered, the rest is open. Of the sleeping platform, which consisted of large stone slabs supported by stone pillars, one-half was preserved. The floor was covered by flat stones lying close together. Of the roof there was not the slightest trace; it had presumably consisted of wooden beams covered by skin and turf. This description fits all the houses in this region, even if they are different in size, form, and state of preservation.

On Skærgaards Halvø there were in all two common houses, two small rectangular houses, and two houses which originally have been large common houses, but which had been made smaller by a partition-wall built inside the house from front to back wall. To this interesting point I shall return later on. Of other remains there were tent rings, graves, and meat depôts, but as they do not differ from others of the same sort in other parts of Greenland I need not enter into details regarding them.

[1] Now called Jacobsen's Fjord, I believe.

During our stay on Skærgaards Halvø we visited a little island in the neighbourhood. Here was a single ruin lying on a bare rock with steep flanks on all sides and more than 30 m. (100 feet) above sea-level. As will be seen in the picture, the passage-way, which usually is horizontal or even sinks towards the house, is almost vertical, a sort of ladder where the unevennesses in the rock form the steps. To a man who is accustomed to find Eskimo ruins lying near sea-level and with a sandy beach in front, this was a curious sight. But why had the Eskimos placed their house on such an inaccessible rock? The only explanation I can give on this question is that they have built it on this elevated place in order to defend themselves against assault. It is well known from Angmagssalik that, before the Eskimos were christened, murder and revenge for bloodshed were of everyday occurrence, and considering that the Kangerdlugssuak Eskimo came from Angmagssalik, as we shall see later on, there is good reason to believe that the same has been the case in Kangerdlugssuak. As a matter of fact, Dr. Therkel Mathiassen in Angmagssalik has found ruins placed on a similar high situation.

It is possible that the same circumstances have determined the placing of two houses on the point, which lies at the entrance to Irminger Fjord and which rears itself 20–30 m. (70–100 feet) vertically out of the sea. It must have been very difficult, if not impossible, to draw the umiaks, kayaks, and sledges up to the houses. On the other hand the place must have been good for bear-hunting, so perhaps this is the explanation of the settlement. As on Skærgaards Halvø, both houses have been made smaller by a partition wall. The last inhabited part of the houses was in an extremely good state of preservation, the floor was not covered by earth, but only by a layer of moss, so that one would think that the last inhabitants left it not very long ago, perhaps a hundred years or so.

In Irminger Fjord there was another settlement lying about midway up the fjord. It was placed on a rocky slope and consisted of five ruins, all of them originally being common houses.

Until now I have only mentioned the houses, but we also investigated the graves and often with good results. Few places in Greenland have given so many and such good grave-finds as Kangerdlugssuak; the Eskimo of this region have been very careful of their dead. The graves were all well built of large stone slabs and most of them contained grave-goods lying either in the grave itself or in a little room built outside the grave. Here is such a grave-goods chamber from Skærgaards Halvø containing a woman's outfit of dishes, scoops, and knives for the use of the dead in the next life. Another woman's grave contained her ornaments, a necklace made of 139 bear teeth and 13 ornamental bodkins, a so-called winged needlecase, a thimble-guard, and a wooden scoop.

Most of the implements were found in the houses. I have here taken a selection of some characteristic types, just to give you an idea about the things we found. You will see two harpoon heads, a foreshaft for a kayak-harpoon, a wound plug, an arrow head, a side prong for a bird dart, three knives with bone handle and slate blade, a leister-prong, a drill with mouthpiece of seal astragalus, a spoon of bone, a bear tooth used as ornament or amulet, and two stone pendants, a bone hook, a toy lamp, a scraper of narwhal's jaw, a wooden scoop, and five different types of woman's knives, the so-called *ulos*.

Slate has been used extensively as material for cutting implements, whereas iron has been rare. Among more than one thousand specimens which we found only one piece was of iron, namely, the drill-point. Most implements are made of bone, ivory, and driftwood.

What do all these specimens tell us about the culture of the Kangerdlugssuak

Eskimo? If we compare them with finds from other Greenland localities it appears that most of them belong to the so-called Inugsuk culture which has been predominating in West Greenland in the thirteenth and fourteenth century, and which is also met with in the earliest culture in Angmagssalik from the latter part of the fourteenth century and the fifteenth century, according to Dr. Therkel Mathiassen. A few types such as the foreshaft with two holes, the wound plug and the two-armed *ulo* belong to the culture of the eighteenth century in Angmagssalik contemporary with the large common houses.

The name Inugsuk culture is given by Dr. Mathiassen to a culture originating from the old Thule culture but with a special Greenland stamp. It came up in the northern part of West Greenland, but wanderings going south have brought it round Cape Farewell to Angmagssalik, Kangerdlugssuak, and North-East Greenland. According to Dr. Mathiassen Angmagssalik has been populated in the latter part of the fourteenth century, but before the sixteenth century a group must have continued the migration northward. While some Eskimo settled in Kangerdlugssuak others went on to North-East Greenland, where they stayed and mixed with another group which came north about Greenland. By this mixture a new culture came up composed by Thule-types, Inugsuk-types, and some types not known outside this area. This culture, the North-East Greenland culture, has never proceeded farther south than Scoresby Sound and has been of no significance to the Kangerdlugssuak region.

The later types prove that there must have been some intercourse with Angmagssalik after the first immigration, even if it was not of great importance. Of the greatest significance to the culture was the importation of the large common houses, which occur in Angmagssalik about the year 1700. The houses of the first immigrants were unfortunately not found; possibly they lie buried under the later houses, or the stones have been used for the erection of these.

But what has become of the Kangerdlugssuak Eskimo and why did they disappear? This picture throws a light upon their fate. It shows a house ruin from the settlement in Irminger Fjord. The first house built on this place was a large common house for six to eight families. By and by the number of the inhabitants has decreased and as each family has its lamp at last there was not lamps enough to heat the large house and a partition wall was built in order to make it smaller. But they must have continued to decrease in number, for at last they have built this diminutive house, which is only little more than 1 m. (3 feet) broad and about 2 m. (7 feet) long. We now understand the rising of the small rectangular houses. Decreasing in number, there were not enough families to occupy a large common house, and consequently they have built houses fitting for one or two families. The last Kangerdlugssuak Eskimo we find as skeletons in the houses; they have slowly decreased in number, and finally died out. But why?

To this question archaeology cannot give any satisfactory answer. Famine has not been the reason, the fjords are now rich on seals, narwhals, and bears, and judging from the many animal bones we found in the houses these animals have also been common in former times. Epidemic is also unthinkable, because the population has decreased in number slowly. The only explanation must be that the natural increase has not kept up with the mortality, which possibly has been great owing to the dangerous life of the men, bloodshed, etc., and if furthermore they have become inbred owing to isolation it is easy to understand that a population not counting more than a few hundred individuals is able to die out during three to four hundred years.

The PRESIDENT: We are greatly indebted to Mr. Larsen for giving us his

brief sketch of the archaeological condition of those latitudes. He tells us that he has sought for an explanation of the disappearance of the Eskimo communities and is sure that there is no question of its having been due to epidemic or famine. But is it not possible that earthquakes on a small scale may have had something to do with it? Some of the ground over which he has taken us is terribly chaotic to look at. I do not know whether the region is one in which there have been earthquakes, and merely suggest the possibility.

Now, ladies and gentlemen, I said prior to the lecturer commencing his most interesting address that we should not hear much as to the part played by the ladies. We have now heard that they had some very anxious moments, and we know that while the men were away endeavouring to reach the crest and peaks of the Watkins range the ladies remained on the ship; but we should much like to hear a little more as to their doings. I am pleased to say I have been successful in persuading Mrs. Augustine Courtauld to come up on to the platform for a moment or two. Mrs. Courtauld.

Mrs. AUGUSTINE COURTAULD: I feel particularly unworthy to represent what our President called "the spindle side" of the expedition, because I am entirely unprepared. But if there are any women here who can persuade their husbands to take them to East Greenland I should advise them to do so. I have never enjoyed anything so much in my life as our stay there.

We were welcomed most charmingly by the Eskimo, who gave us an example of how one should live. With us there were fourteen Eskimo: a mother, her son, daughter-in-law, and three children, another man and his wife, and their children, all living in one tent in perfect harmony!

As to the country itself—well, the only word to describe it is fairyland. It is more beautiful than I thought possible.

The President asked what we did. Well, we spent most of our time just looking round. While our husbands were away on the inland journey we had some pleasant picnics and went out collecting flowers.

I am afraid I cannot find anything more exciting to say because really we played a minor and domestic part in the expedition and generally spent our time enjoying ourselves.

The PRESIDENT: Mr. Spender, will you come up and add a few words? Mr. Spender, as Mr. Courtauld told us, has previously flown over a great deal of this ground, and we should like to hear some remarks from him on what he saw from the air.

Mr. M. A. SPENDER: It is difficult to follow such a charming speech as that which Mrs. Courtauld has just made, especially when I have to deal with a subject so dry as map-making.

I should like to explain how it was that the Geodaetisk Institut's map of that part of the East Greenland coast came to be made. When we went up in 1932 with Captain Mikkelsen [1] we had no idea that the Seventh Thule Expedition would fly there the following year. We made the land at about the middle of the Blosseville Coast, from which we continued down, trying to carry on a survey right to Kangerdlugssuak. Actually we did not succeed because we had troubles which caused us to break off the coastal survey before we reached Kangerdlugssuak.

Our coastal survey came on as far as Wiedemann Fjord, which was the fjord from which Courtauld hoped to start his journey. Here we were driven out to sea and could not begin again until we came to Kangerdlugssuak. Kangerdlugssuak we mapped with a fairly rigid sort of triangulation, and there the matter

[1] *Geogr. J.*, 81, no. 5, May 1933.

was, as far as we knew, finished. We could not map the inland region because we had not seen the country.

It was Dr. Knud Rasmussen's plan in 1933 to try to get air-photographs of this coast, and he succeeded in doing so. But even then we were not very much farther forward because there were not enough fixed points on that piece of land to start making a map from the air photographs. That we could start at all was due to the fact that a series of photographs taken parallel with Kangerdlugssuak had in the background a mountain which we had fixed in 1932, the 2500-metre mountain (about 8000 feet) near Wiedemann Fjord which can quite easily be seen over that whole stretch of country of about 100 kilometres. Once we had set up our photographs, fitting them on this foreground control at Kangerdlugssuak and taking that mountain as background point, we could plot out a number of other points half-way between. That, more or less, is how that map came into being. We crossed off the routes running at right angles to the coast with those running parallel to the coast.

Those of us who have skirted this part of Greenland in small boats and tentatively set foot on the seaward slopes can at least point out some aspects of the task Courtauld and Wager set themselves last summer. For instance, most people wanting to climb into Greenland avoid a mountainous part with its crevassed glaciers and melting snow. And then they start earlier in the year, possibly from a winter camp. Courtauld's expedition had to face the fact that if they got through the ice at all it would be late; and even then there was no guarantee of making any given part of the coast, should some particular bay or fjord have seemed to be a suitable landing place.

Before they started no one knew what the glaciers would be like once they were in the country. But perhaps the great tradition of Himalayan climbers deserves mention in passing for having handed down, if nothing more, at least the knowledge that glacier travel can be perfectly practicable provided one pays sufficient attention to weights. I feel myself that the experience which Wager had had on a Mount Everest expedition must have communicated some confidence to the party.

The expedition stands out as a remarkably neat piece of work. Many of us had thought that the easiest approach to those mountains might well be from the west coast of Greenland; and I assure you that even a familiarity with the air photographs of the region didn't tend to alter that opinion, for they only showed that to find a crevasse-free route a great distance would have to be covered, possibly without sledges.

That their party did what they set out to do during a summer so difficult that no other party even got half-way through their plans, is most satisfactory. I had had a fear that we might year after year witness different expeditions going out to climb this mountain. Perhaps there would be several in any one year and all sorts of international complications. But now this fine summit—the highest in Greenland, the highest in the Arctic, and apparently the famous Hvitserk of the Norsemen—has been climbed by Courtauld and Wager at the first attempt, and that is the best that any of us could have wished for.

The PRESIDENT: Mr. Wordie, may I call on you for some observation or comment? You will remember that twice before Augustine Courtauld has been on Cambridge University Expeditions under the leadership of Mr. Wordie.

Mr. J. M. WORDIE: It is a very great pleasure to be here to-night to congratulate Mr. Courtauld on his success. As you must have noticed, he has consistently tried to put himself in the background and has very gallantly given all the credit to Wager and Longland. But he cannot entirely divest himself of responsibility; it was the lecturer himself who initiated the expedition, and

he must certainly now be given credit for its remarkable success. You must not forget that it was Courtauld who chose the captain of the ship, Captain Schjelderup, a great Arctic skipper, and Courtauld also who chose his two mountaineers. It must have fallen to him therefore to experience all the hopes and fears that a leader always must have as to whether his expedition will or will not succeed, whether his decisions will prove right or wrong, and whether a way will open before him as he climbs each successive glacier or mountain-top and looks ahead.

In the same self-effacing spirit he has also omitted to mention that the mountain which he climbed was the highest in the Arctic and that, following its discovery by Watkins in 1930, it immediately became a tempting goal for the mountaineers of all nations. In 1934 more than one party tried to penetrate inland, and many of us feared it might not fall to Englishmen to get to the top, for we very much wished that the honour of climbing the Watkins Mountains should if possible go to one of Watkins' old party and perhaps above all to Courtauld, who had so ably seconded Watkins on his great expedition and had himself contributed in no small way to the romantic side of that expedition by his vigil alone on the ice-cap. You hardly need to be reminded of that experience. When his friends heard that he was alone we may at first have been concerned, but not for long, as we all knew that he had the requisite courage, and probably more than any other the gift of a certain philosophic calm. This was perhaps the most important of the many qualities necessary for one placed as he was. His philosophic attitude stood him in good stead throughout that long Arctic winter alone on the ice-cap, and it is a quality which we may feel sure will remain with him throughout his career.

The PRESIDENT: Mr. Spender and Dr. Wordie have given their expert point of view of the performance of Augustine Courtauld's expedition so fully and favourably that they have not left me much to say, from that standpoint, except that I should like to add how heartily I endorse, so far as I am in a position to judge, all they have said as to the achievement. Remember, the expedition went with a set purpose. The mountain had been viewed from the coast side by Watkins. Then Martin Lindsay came across from the west, hoping to strike the range from that direction, it being apparently impossible to reach it from the east. The observations which he took when he came to the range and turned south corroborated Watkins' observations and the conclusions he had come to. Now we have had this expedition going to set any remaining uncertainty at rest and if possible scale the peak. That purpose they have accomplished.

The Watkins Mountain is now definitely established on the map, and thanks to the broadminded attitude of the Danish Government the Watkins Range remains the name of that range, and we are greatly indebted to them for adopting it. It has been a great pleasure to us to see Mr. Helge Larsen here, and his lady, whom we also cordially welcome. We are always most grateful to our Danish comrades for their invariable readiness to cooperate with British parties exploring in Greenland. I am sure they realize how cordially we appreciate their attitude.

I now ask you to join me in thanking Mr. Helge Larsen for his sketch of those interesting archaeological remains of Eskimo life and then join me in thanking Augustine Courtauld and congratulating him heartily on a most successful enterprise, at the same time wishing him further successes to come.

PERSIA IN 1935: *A paper read at the Evening Meeting of the Society on 4 May 1936, by the*

BARONESS RAVENSDALE

I HAVE no justification to lecture to this great Society to-night. I have done nothing spectacular or new, nothing worthy of the minds of its members who are accustomed to great names, great explorers, with thrilling experiences to recount. I come at the honourable invitation of your President, as the daughter of my father, who loved this Society so deeply. My only justification can be a profound love of the country he immortalized in his two great volumes, and a humble endeavour on my part to draw for those who have not been to Iran lately, a picture of this noble country as she is to-day, so different from the Persia my father traversed in 1889.

I chose to go to Iran *via* Leningrad, in order to improve myself with the splendours of the Iranian Exhibition in that city. Soviet Russia owns a large proportion of the greatest Persian works of art, in the Hermitage: it was worth going there if only to see the urns, and the silver and gold plates of the Sasanian Dynasty (A.D. 222 to A.D. 650). A perfectly comfortable wagon-lit, minus restaurant car, ambled us in three nights and two days from Moscow to Baku. That monstrously ugly city reeks of oil, and scores of dekkars ruin the skyline. The distinguished Persian Delegation to the Exhibition, headed by Mr. Hakmet, the Minister for Education, followed us down to Baku on a train with a special restaurant car. The customs officials were so dazed by the glitter of the splendid impedimenta of the Delegates, stamped and starred with every known privilege, that we humbler "fry" got through in the general bustle and scuffle, as being too contemptible to toy with. Not so on board the puffing, groaning little Soviet steamer, where we rose in our might, each with a cabin ticket, to protest against two large, perspiring gentlemen already installed in each of our cabins and preparing to unpack. Bedlam broke loose. Fortunately the volleys of remonstrance and abuse fell on deaf ears, for I could not understand a word, but I endeavoured to convince the one and only harassed "Intourist" guide that the ship's Company had sold each cabin two or three times over (which was the case). She then said I had insulted the Soviet regime, but after a sordid tussle, we three ladies retained possession of our cabins.

The Caspian Sea, from all accounts generally in a state of turmoil, was as calm as a mill-pond that night, and we reached Pahlevi, the Iranian port, at 10 a.m. It was formerly called Enzeli, and reverted to Iran in 1921 after the Russo-Persian Treaty. We slept the night at Resht, now becoming an entirely modern town with a bandstand and standard lamps. Let me quote from my father's book his reference to Resht in 1889 as an eye-opener to our different modes of travel:

> "At Resht the traveller will form his first experience of that Persian wayfaring, of whose pleasures and pains I shall have so much to say. Here he must decide between the only two practical methods of travel in that country—riding Chapar, *i.e.* by Government post, or riding with his own

animals and appointments by caravan. The former means rapid, if exhausting and sometimes painful progress. The latter is unutterably tedious as the same animals must be used day after day."

We, on the contrary, departed next morning in admirable hired Dodge motor cars, and drove along the beautiful tropical seaboard of the province of Mazanderan. This is the native province of His Imperial Majesty Reza Shah Pahlevi. Some weeks later, on my way to Bandar Shah, I passed the valley of his birthplace, which adjoins the railway, in its progress from that port, to the capital *via* Firuzkhu. The peasants working on the coffee and cotton plantations in this tract are paid a modest wage by the Shah, but who, I wonder, are going to fill the great unsightly modern hotels, pushing their heads into the air in this oriental setting? It is the south of France to His Majesty, stiff gardens with aching and disgusted plants descend to the seashore, flights of steps are protected by rampant lions, alternating with statues of undraped and be-silvered ladies, pathetically clutching electric-light bulbs in their fingers. The enjoyment of these Monte Carlo conditions of life costs you £1 a day for your room alone; so far there is no heavy booking.

We then climbed the superb Chalas road which ascends in incredible twists and turns up and up through the amber Elburz mountains until, passing over the crest, it emerges upon a magnificent plateau which seems to stretch into eternity. There was no such road in the days of my father's visit. He went *via* Kazvin, which lies on the main route to Kermanshah and Khanjkin. And if we wonder what has caused these splendid roads to be made by the present Shah, one not insignificant point is the arrival of the cheap motor car during the war. It will be remembered that this great country of Iran, as we are now invited to call it, as large as France, Germany, and Italy combined, had lain practically dormant since the days of Shah Abbas. From 1587 to 1629 that greatest ruler of the Safavid Dynasty restored Iran to its fullest glory. He ensured the safety of the caravan routes; and along the hundreds of miles of dusty track, decaying bridges and splendid caravanserais still testify to the encouragement that enlightened ruler gave to merchants and travellers passing through his country.

Iran to-day is going through just such another awakening under her present ruler. The endless dusty roads are safe again for travellers; bandits will not molest you when you have the seventh puncture in a day from the countless nails left behind by donkeys and horses, that worm their way through the endlessly brushed surface. Can you see what all this means to the Irani of to-day? Previously they had to "stay put" in the town or hamlet they were born in, now motor lorries whirl them across these limitless distances to all the big cities. They can see their country as she is progressing, read newspapers, study in schools, and become citizens of the world after centuries of ignorance. Their patience is fortunately limitless, as invariably the lorries break down and all the occupants may have to sleep the night by the roadside whilst the driver and innumerable incompetent assistants lie underneath the bonnet of the car, banging away at repairs, of which they only have the sketchiest knowledge.

On reaching the summit of the Elburz mountains you see stretched away

in front of you this limitless grey-brown plain, until you "hit" Tehran, which curiously, like many Iranian cities, suddenly bursts on your horizon out of seeming blank space. I can only use that word "hit" to those who have travelled in Persia: they will know what I mean. The city is rapidly developing into a great modern metropolis. Many old buildings have been pulled down, including some of the lovely tiled gateways leading out on to the great caravan roads to Kazvin, Meshed, and Qum. Only a few remain as colourful and gay reminders of other traditions and viewpoints. Many of the new buildings are copied from the palaces at Persepolis with fine pillars and capitals adorned with the bull and lion heads, so they do not wound the eye, and the Gulistan Palace belonging to the Kajar Dynasty is admirably preserved, containing as it does the much disputed Peacock Throne. This throne was supposed to have been brought by Nadir Shah in 1739–40 from Delhi, but my father contends that the Peacock Throne was discovered in a broken and piecemeal condition by Aga Mohamed Shah and that he had it made up into the throne of modern shape and style now standing in the Palace at Tehran.

In the newly erected House of Parliament there is a machine which taps out the names of all incoming members, also of those absent, on whom a fine is imposed. I feel that such methods employed here would produce a considerable fund for some useful purpose, coming from non-attendant members of both Houses. Fortunately His Majesty is aware of the wealth of ancient buildings and mosques his country possesses, and unlike many orientals who so often do not seem to want to preserve their beautiful monuments, he has inaugurated a great survey of such buildings, and, at considerable sacrifice, money is being liberally allocated to the preservation of these exquisite relics.

A few miles from Tehran lies the ancient capital of Rayy, holding the secrets of many civilizations, now being excavated by Eric Schmidt. He is the successor of Professor Herzfeld at Persepolis and with his band of young archaeologists is carrying on the splendid labours of his predecessor. Away to the left, dwarfing altogether the distance between, towers the mighty cone of Mount Demavend, a mountain which signifies as much to the Persian as Fujiyama to the Japanese—and though the chimneys of His Majesty's cement factory nearby testify to the huge strides being made in the industries of the country, nothing can change the glory of the setting sun, turning that eternal snow-capped peak a blush rose and bathing the dusty plain in a carpet of gold, across which the tinkle of endless camel bells sends you a message, charged with the ancient history of this magnificent country. Looking down on that golden radiance from the old fort of Rayy, I knew then that the landscape of Iran, unique unto itself, had eaten into my very soul, and I felt that the two exquisite tomb-towers, one in the village of Demavend, and the second that of Ala-ud-din (1281) near the battered mosque at Veramin, could hold their own against all modern monstrosities.

As a point of interest demonstrating the effective control of the country by His Majesty the Shah, the Rayy excavators told me the following story. Previously when they went to Luristan to excavate, they ran considerable risks at the hands of bandits. Now the sons of the old Luristan chiefs are

The mosque at Q

collected in a military college in the neighbouring town and are used as guides or hostages for the excavators and as guarantors for their safe return.

The three hundred odd miles from Tehran to Isfahan give you a perfect example of this endless dusty, amber plain, bounded by scraggy mountain ranges that turn burnt sienna, orange, and vermilion as the sun plays on them throughout the burning day. There is so little that is tangible by which I can describe this; therein lies its wonder. A grim salt lake, like a palsied hand, stretches in front of you before you reach Qum, the old sacred city of the Shia faith. There in the sanctuary lies the body of Fatima, the sister of the 8th Imam Riza A.D. 816, who himself lies buried at Meshed, the first sacred city of Iran. We were not allowed to go inside those holy precincts, but only to gaze at the golden minarets that blaze endlessly into the pitiless blue sky.

There is an old custom still observed in Persia that the traveller on first seeing the city of Shah Abbas cries "Isfahan Nisf-i-jahan" that is "Isfahan thou half of the world." Out of the earth-coloured atmosphere the silver Zindeh Rud winds slowly along the valley, creeping through groves of whispering trees; and then, suddenly, there flashes upon one's gaze the heavenly blue domes, marvellously shaped, exquisitely tinted. No city of the East ever had such colourful signals to lure all and sundry to her portals. The fluttering avenue called Chahar Bagh or "The Four Gardens," planted by Shah Abbas, is the Constitution Hill of Isfahan. The young bloods of Iran mooch amiably up the gentle slope, passing the heavenly blue-tiled Madresseh (or sacred college) of the eighteenth century till they reach the Maidani Shah, 560 yards by 74 wide. The delicate Ali Kapi or palace for public audiences looks serenely down on the scene of the ancient games of polo, but now only the marble goal posts testify to what took place there; for, alas, a pond and ugly modern flower beds surrounded by iron railings ruin what is one of the noblest city squares in the world. The Governmental offices now surround the graceful Chehil Sutun or "Hall of forty Columns." A charming Governor gave us of his unbounded hospitality in a tea-party with delightful Persian sweetmeats and cakes fit to ruin the digestion for ever. In Moscow I had been advised by friends not to mention my identity as Lord Curzon's daughter. It may be remembered that His Majesty Ahmed Shah at the end of 1919 visited England as a sign of his approval to the Anglo-Persian Agreement drawn up by my father and duly signed on August 9 by Sir Percy Cox and the Persian Government.

Who at that time could have dreamed of the meteoric entrance of the Cossack Colonel Riza Khan, who in 1921 was to abrogate that Agreement and so bring to nought the work of a man who sincerely and devotedly loved his Persia and sought to save her from the internal chaos which then prevailed. But my diffidence in referring to my father proved needless and my fears unfounded. That delightful Governor took pleasure in introducing me to men who remembered him. I even met the son of the noble with whom he stayed in Isfahan; while in Tehran I did not fail to find a warm corner of personal regard and admiration for him in the heart of Madame Nasr-ul-Mulk, the widow of the distinguished Regent who was a contemporary of my father's at Balliol, and whose daughter is now the lovely and gracious wife of the Iranian Minister here in London.

e Madresseh, Isfahan

The three points of splendour that hold the eye in Isfahan are the Masjid-i-Shah, built by Shah Abbas with eighteen million bricks in 1612. No more heavenly blue could you ever gaze on, than the tiles of the dome and the graceful minarets. The Masjid-i-Shaikh Lotfallah built for Shah Abbas' father-in-law, on that golden yellow dome rare designs of curving branches and flowers take your very breath away. Then lastly the venerable Masjid-i-Jameh, A.D. 1200, holding such intricate and delicate brickwork in its domes, and archways, that Women's Institutes could find eternally new patterns for their cross-stitch samplers. Leaving that sublime city of running waters and green trees, I next reached Persepolis. Looking out on the limitless brown plain from the capital of the Achaemenian Empire, I saw, not far away, a great sugar factory rearing up its mighty modern head—yet another sign of advancement. But in spite of ancient and modern in such close proximity, the setting on the great terrace to-day is even more superb than it was in the time of Darius I or of his son Xerxes, for the great 50-foot wall protecting the palaces is gone, and the battered columns and the magnificent double stairways stand open to the winds of heaven.

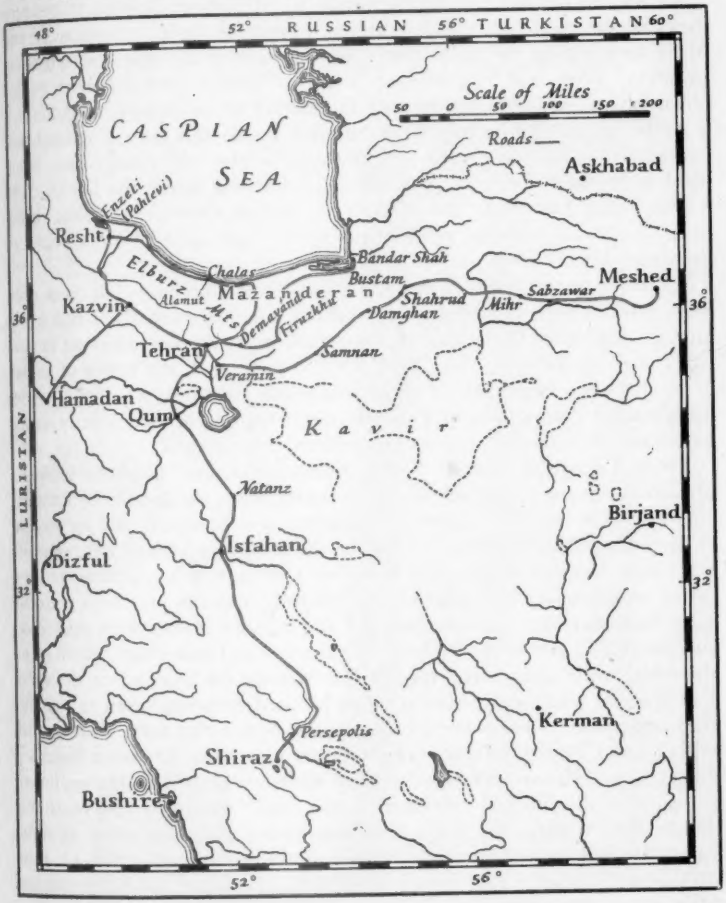
Thence onwards to Shiraz. Its beauty lies, for me, in the peep of it from the police post up the mountain side, with the domes quivering like jewels in the setting sun; but its great poets Hafiz and Saadi lie in ugly modern tombs, and the gardens are somewhat of a disappointment. On my way to Naksh-i-Rostam from Persepolis I was fortunate in meeting a small migration of tribes, I believe they were Bakhtiaris, moving slowly down with all their flocks, to the lush green valleys, for pasturage. Their black cloth tents were piled high on the camels, along with the children, and these simple people were escaping from the barren sterility of their mountain homes. But the Shah wishes to discourage these yearly migrations and so keep the tribes settled and unarmed. In the furtherance of this policy many of their chiefs are now detained in Tehran and their plight is a somewhat pathetic one.

The splendours of the Naksh-i-Rostam equestrian rock reliefs and the Tomb of Darius V are hard to surpass. Here you see Shapur I, the great Sasanian monarch, triumphing over Valerian, the Roman Emperor, after his capture at Edessa in A.D. 260. In front of the next relief is a notice forbidding you to do a great many things, but it is so high up you cannot read it and it entirely ruins the beauty of the monument. According to my father, Canon Rawlinson suggested that this relief represented an incident in the life of Varahran II, who, ruling tyranically, was taken to task by his nobles and forced to give amendment and reform. He continues: "I doubt whether a monarch would voluntarily select such an incident for eternal commemoration. Had a Royal Academy existed in England in the days of King John would he have commissioned the President to paint a great picture of Runnymeade and the Magna Charta ? "

It is worth returning to Tehran by another route in order to appreciate the delicacy of the minaret and doorway of Natanz, where sapphire and turquoise blue twine their vividness in inscriptions and flower-like patternings that beggar description. The village of Yazd-i-Khast holds a forbidding grimness jutting out over the new road, with its haunted empty-window eyes,

and a slowly dying soul inside. These are the tragic relics which make up the Persia I love.

I next motored up north again, to the Caspian, to the port of Bandar Shah, viewing the incredible structure of the Shah's railway creeping slowly through this stupendous mountain gorge, a unique feat of engineering. German



contractors reclaimed the marshes of Bandar Shah and laid the foundations of the harbour and railway-head, and now Swedish engineers are completing the railway, which having arrived at Firuzkhu is due to reach Tehran within a year. The audacity of any government in embarking on such a stupendous undertaking, the cost of which has I believe been met by special taxes in tea and sugar, does indeed make one wonder, but I believe I am correct in saying that the Shah willed it, began it, and means to see its completion, as a matter

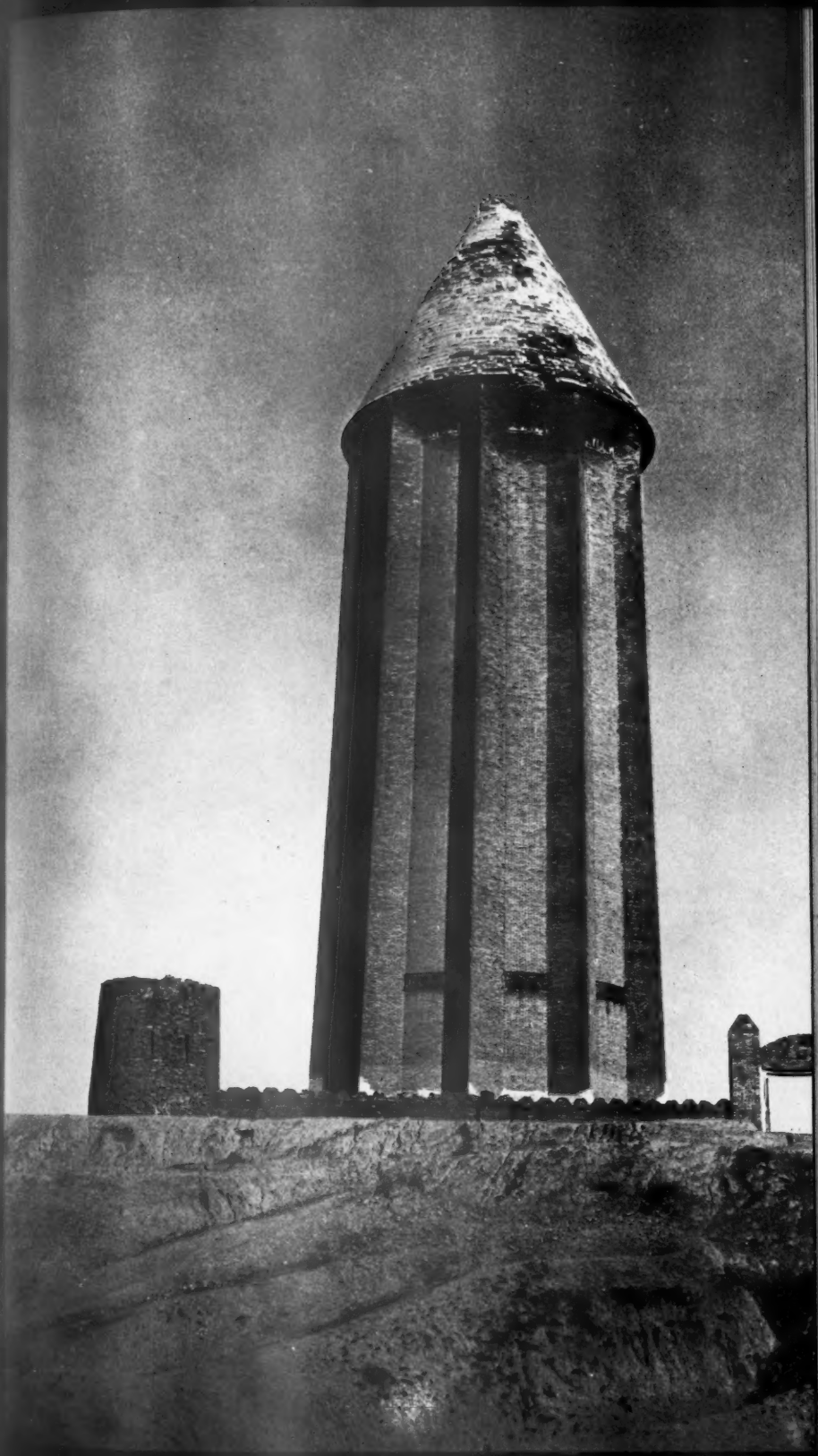
of his personal prestige. Beyond the spruce and straggling portlet of Bandar Shah, where we slept the night in the railway waiting-room, we collected a prince of liars in the person of a guide, who said he could take us across the limitless Turkoman steppes to the Tomb Tower of Gumbad-i-Gabus. His sense of direction was nil and he rushed us into bogs and quicksands; but I assumed after careering madly and blindly about for hours that that stupendous brick needle must surely beckon us very soon from 10 or 15 miles away, and there sure enough the noble tower showed itself in the glittering afternoon sunlight, alone and majestic, an arrow of dainty fawn-coloured bricks, dexterously laid, clear cut against the distant snow-capped mountains. A pathetic group of old men were huddled inside this superb mausoleum, temporarily a squalid prison; for these venerable old beings were being held as hostages for their sons who had deserted across the border. The Government has made every effort to civilize these Turkomans, bring their boys into schools, teach them sports, and give them a sense of responsibility.

Dotted over the plain are still to be seen some Turkoman felt tents, with their interior walls beautifully embroidered in coloured wools. I fear it will not be long before these relics of the nomad tribes on these limitless steppes are lost to us for ever. As I have already mentioned, the policy of to-day is to check the migrations of these wandering creatures, who for centuries have roamed these spaces with only heaven to approve of their nightly resting place, and settle them in ugly permanent mud brick houses.

From Tehran to Meshed is 700 endless miles, but telephone messages ahead can procure you a bedroom in one of the many garages run by Russians that are to be found in Samnan, Damghan, and Shahrud; and in none of these towns did we receive anything but the most courteous of welcomes and the fullest facilities to see their beauties. Lorries stop at all these garages. Many are crammed with pilgrims for Meshed. You can procure a perfectly good bedroom with a brass bedstead and a hand mirror with pink roses surrounding it, and if you desire, a tooth-brush and hair-brush which lie on the table, while many oleographs of His Majesty the Shah adorn the walls. I took about four days motoring up to Meshed, stopping often to examine the monuments. You can by travelling all day do it in two days. Four English miles go to a Persian *farsakh*, but my father says, "the Khorasan farsakh is famed beyond all others for its odious and inexhaustible length—a compliment in reality to the funereal monotony of the road." In his day the route was divided into twenty-four stages, the post-houses averaging about 23 miles apart. My father completed the journey in the opposite direction, *i.e.* from Meshed to Tehran, in nine days, averaging 60 miles a day, and he approached Meshed *via* the northern route from the Caspian. Though quick riding according to him was an accomplishment for which the Persians were famous, his miserable steeds could never have justified this boast. He writes:

> "The best known characteristic of the Persian post horse is his incurable disposition to tumble. I could not make out that either a tight rein or a slack rein had very much to do with the occurrence of this phenomenon, and I ended by concluding that the Persian post horse has a certain regulation number of falls in the year, which may be distributed either by accident

Tomb Tower of Gumbad-i-G



or as he pleases, but the full tale of which some hidden law of necessity compels him to complete."

The road to Meshed abounds in exquisite buildings. Bustam, surrounded by snow-capped mountains, holds concealed in lush green trees twelfth and fourteenth-century minarets and mosques, like colossal nuggets of turquoise and sapphire. Never did dark and pale blues rush more intoxicatingly after each other in such a wealth of tracery round doorways and arches. Damghan has an exquisite minaret, and also the Tomb Tower of the Forty Girls (A.D. 1041) with a bewilderingly beautiful brick inscription. At Mihr there is one of the most beautiful of all Shah Abbas's caravanseries. In the village you can buy delicious hot partridges, freshly cooked, and sold for a few pence in a sandwich of soft bread. Sabzawar has a beautiful minaret (A.D. 1111), unfortunately restored with a white top like a chimney-pot. The ugly modern tomb of Omar Khayyam tries quite unsuccessfully to compete against the beauty of the tomb of the brother of Inam Riza, alongside it. Nothing can take away the enchantment of these old Persian tiles and Kashis. The modern tomb of Firdausi at Tuss seems to cry out in its loneliness, because of its unsympathetic shape, and you will still prefer to visit the Khaja Rabi (1616), Qadam-Gah, built on the lines of Taj-Mahal, and the battered Masjid-i-Shah in the centre of Meshed.

Meshed being the most sacred city of Persia, I desired to go there, if only to look on the exterior of the dome of Inam Riza's tomb, and peep from afar at the polychrome exterior of the Gohar Shad Mosque unrivalled anywhere in Persia. The city itself is worth visiting if only to see the various types that pour in from the surrounding country: black-browed Afghans, wild Badawin, Indian traders, Caucasian devotees, Turks, Tatars, and Mongols, make a bewildering kaleidoscope. Originally I had not the faintest hope of entering the sacred shrine; only a limited few had succeeded at the risk of their lives, disguised, and curiously I asked myself why should these devout Shias not hold on to their sanctuary and forbid us infidels to enter? To them it is the stronghold of their belief and they have a right to retain it. But everywhere the Shah is slowly breaking down this undue fanaticism, and in all other cities you can visit the mosques with a guide. Qum and Meshed are the sacred Shia strongholds and will be the last to succumb. The power of the mullah is slowly being broken. Many of them have no justification to be called mullahs, or to wear the green turban as descendants of the Prophet and so batten on the ignorant masses, but now His Majesty demands a stiff and honourable examination before you can become a mullah.

Some weeks before I came to Meshed an unpleasant episode had complicated the situation as regards Inam Riza's shrine. A certain Inam had gravely inflamed the pilgrims by attacking all forms of modernization, such as the abandonment of the *chaddar*, the drinking of wine, and the wearing of European clothes. The situation became grave, and the pilgrims were requested to leave the mosque precincts. Misunderstanding the situation, and imagining the sacred precincts were a sanctuary against all trouble, they remained, and got involved in a wildly inflammable group who raided the shops in the Bast, breaking them up and rending the European clothes off the shopkeepers. The Governor rushed in Baluchi troops with machine

guns, and scores were slaughtered. The true figures will never be known, as lorries were hurried down to bury all dead and dying, and it is better to ask no questions, though an American missionary in Meshed, who has worked there for fifteen years, believes the action of the Governor was fully justified owing to the gravity of the rioting. All the more reason you would think for my not being allowed to enter the shrine when I got to Meshed. But two friends of mine from the British Legation in Tehran had been conducted through the shrine under the protection of the Governor before my arrival, and this raised my hopes considerably. Our visit to His Excellency was a vital one. How different from my father's! He said: "Our conversation was not of surpassing interest, as the Governor contented himself with civil and conventional replies. I asked him if he thought railways were likely to come to Persia. 'If God be willing, yes,' was the somewhat ambiguous rejoinder." But the unbelievable occurred. The Governor said he would arrange for us to go through the shrine that afternoon; the women to go disguised in *chaddars*, and the men to go as they were. He could not disguise 6-foot Englishmen as Turkish pilgrims. My father was only conducted over the roofs of the bazaars to the spot where he could see the sacred buildings, and he claimed the modest distinction of being the first English Member of Parliament to enter the walls of Meshed.

I am not sure of the soundness of this method of filtering through a chosen few, to break down the hatred of the pilgrims by inches. A few shrine officials could not save you from being lynched by those fanatical beings if they turned on you, though it is true to say they were now chastened after the events of the rioting. Our progress through the Bast or sacred bazaars and the glorious tiled courtyards of Shah Rukh and Shah Abbas, was about the most terrifying experience of my life. Picture a succession of chambers decorated in cut glass like the glittering facets of millions of diamonds. These rooms were packed with a shrieking mob of devout worshippers, kissing the exquisite silver doors leading towards the shrine, murmuring verses of the Koran, kneeling in scores and bumping their heads on the lovely alabaster floors in a frenzy of devotion. All this takes place long before you get to the Inam's shrine. When we got there we slowly made a procession round the three sides of the tomb. It is inadvisable to try the fourth, as there is only a foot space between the tomb and the wall, and you have to file through singly, and there you might get into trouble. That innermost chamber of glorious cut glass with floral designs in gold was a seething mass of demented, excited zealots, struggling and fighting to get near the great silver cage in which the coffin lies, handing their children over the heads of the crowd to kiss the bars or tie on a tiny piece of cloth. I was concealed in a *chaddar*, and though I expect that no devout pilgrims ever look up at the unbelievable tiles in the different domes and adjacent chambers, I meant to see as much as my frightened eyes could take in. But indelibly stamped on my mind for always will be the agonized look of about eight mullahs, kneeling by the wall, reading their Korans. They saw our pitiable little group filing through; their looks were not of murder or hatred, but of pain, as if we had done some injury to their innermost soul that could not be repaired, combined with the look of cowed and beaten men. One of our Englishmen knowing Persian heard many times murmured,

Masjideh Shah,

"Foreigners," "Infidels." We were allowed to gaze all too briefly on the lovely polychrome façade of the Gohar Shad mosque built in 1418 by the wife of Shah Rukh. In a private room looking full on to the burnished gold dome of the Inam's shrine we were shown Korans from the Treasury that made the spirit weak for beauty and delicacy of design.

When I left Tehran the first snows were capping the mountains that protect the city, and I travelled *via* Kazvin, Hamadan, and Kermanshah. From Kazvin, in the distance, you see where Miss Freya Stark entered the Valley of the Assassins to visit the fortress of Alamut, which she so ably describes in her book. At Behistun, high up on the mountain scarp, I gazed on the famous inscription of Darius the Great in the Babylonian, Elamite, and Old Iranian scripts. This inscription it will be remembered gave the key to Sir Henry Rawlinson for deciphering cuneiform inscriptions. At Taq-i-Bostan I looked at the wonderful rock carvings of Shapur II and III of the fourth century, and the superb workmanship displayed in the boar hunt is a delight to all. It is a pity that an unsightly new tea house and an ugly stretch of wall are allowed to ruin the natural beauty of the setting. These were my last archaeological memories of Persia, but still we had to battle with a few more police posts. I am fully aware of the immense service these police posts in every town have rendered in the rounding up of bandits, deserters, and objectionable characters, but I do hope that before long, now the main dangers are past, it will be possible to do away with them. I found even my insatiable Baedeker-courage melting on arrival at the sixth or seventh police post of the day, when the commandant looked at my passport upside down and asked me my mother's birthday and the Christian name of my father. Imagine Thomas Cook's motor bus tours, seventy or eighty strong, being held up like that. They would be there for weeks. It is because I know that the Government are really anxious that the beauties of their country should be open to tourists that I venture to suggest this reform. For me on the one side is the old Persia, a land of poverty and rags. I have seldom seen anywhere so many beggarly and dejected people. On the other hand one sees hordes of bright little boys, rushing out of schools grasping business-like attache cases, dressed in European clothes and wearing chauffeurs' caps. One little fellow asked a friend of mine about New York and Boston. These youngsters are becoming the capable young citizens of the future. A decree has gone forth abolishing the *chaddar*, but I regret the passing of some of the old signs, like old men in their flowing robes and their henna-dyed beards entering the mosques to pray.

I must pay a final tribute to the great personality which in this critical epoch has established a powerful central government, working effectively throughout the country. Never were stable governments more necessary than they are to-day in this distressed world. I hope His Majesty will be spared for many years to come to carry out the reforms in this country he desires. His son is completing his education in Switzerland, and is said to be a most promising boy, but successors to dictators are problematical, and it would be a calamity if the removal of the strong hand were to be followed by a swing back of the pendulum, and ensuing indifference creep once again over the people with that pitiless blazing sun always ready to crush and rot the energy that was aroused for a spell.

illage near Demavend

May I end by saying that I hold for Persia the warmth in my heart my father held for her. She has bewitched me with her enchantment, with the blue tiles of her mosques, the burnt sienna and rose madder of her endless plains and the violet blue of her mountains tipped with snow. I want to see her make good in her new and great experiment as one of the noblest countries of the world from whom we can all learn something.

DISCUSSION

Before the paper the PRESIDENT (Major-General Sir PERCY COX) said: My Lords, Ladies and Gentlemen, I do not, as a rule, keep you waiting very long before calling upon the lecturer of the evening, but on this occasion you must allow me a few moments longer than usual.

I am sure that Lady Ravensdale will realize from the size of this audience and the reception given her just now how extremely welcome she is to this Society. She is going to talk to us of her experiences in Persia, or Iran as we now call it, in 1935. She was reluctant to do so: indeed, it required a great deal of friendly persuasion on my part to induce her to come here and address us this evening. You will all, I am sure, feel that the presence here on our platform of Lord Curzon's daughter and the fact that she is going to talk to us of Persia is a great occasion for us. For all of us in this Society know what an immense debt we owe to her father. Mainly to his courageous and untiring efforts do we owe the possession of this fine Hall and the additions that we have been able to make to our building. But for those personal efforts of his we should probably have been unable to obtain this property. Now that we possess it, we are all very proud of it. Lord Curzon was associated very prominently with the Society for many years. He was our President from 1911 to 1914, and throughout his life he looked upon the Society and its labours with an abiding interest and affection.

I myself have a particular interest and pleasure in welcoming Lord Curzon's daughter at our Forum to-night and in hearing her speak on Persia, owing to the fact that it was Lord Curzon who proposed me as a Fellow of this Society nearly forty-five years ago, and who during his lifetime, both during periods when he was as it were my official chief and indeed always, was an exceedingly kind friend to me. I will not detain you longer but now ask Lady Ravensdale to address us.

Lady Ravensdale then read the paper printed above and a discussion followed.

The PRESIDENT: We are honoured by the presence of the Iranian Minister, H.E. Hussein Alà. We shall be pleased if he will favour us with a few observations.

H.E. THE IRANIAN MINISTER: My Lords, Ladies and Gentlemen, It is a very bold action on my part to come on to this platform to address you this evening after the most eloquent lecture you have listened to from Lady Ravensdale. Especially is it bold in view of the fact that I have in no way prepared myself for such an auspicious occasion. I must however say that it has been an immense pleasure and great privilege to listen to Lady Ravensdale's lecture. The ease with which she delivered it, her sense of humour, the grace and the eloquence which she has displayed are naturally to be expected from the very handsome offspring of one who was England's great and eminent orator and statesman.

Lady Ravensdale has said many pleasant things, and some unpleasant ones, about my country, but I have felt throughout her remarks that she is a real

friend to Iran. Therefore I am most grateful to her, and thank her very much indeed for all she has told us to-night. She has followed in the footsteps of her brilliant father, whose monumental work on Persia, although it was written a very long time ago and things have changed very much in Iran since he visited the country, is still the standard work very much looked up to and referred to.

It is a fact that Iran has changed very much, and more particularly during the last eleven years since the accession of His Imperial Majesty Reza Shah Pahlevi, to whom Lady Ravensdale referred in such happy terms. The Shah has done a great deal for his country in the way of establishing order and tranquillity, improving material conditions, constructing roads and railways, encouraging education and hygiene; but best of all the results of his efforts, and that which will always survive, is the new spirit of patriotism and self-reliance which he has infused into his people. Iranians now think and feel very differently from what they did in the past, and that is an enduring thing. The present state of mind of the nation will preserve it, I am certain, in the future, through all vicissitudes, and will enable it to work out its salvation and to develop resolutely in the path of progress.

As Lady Ravensdale has told you, Shah Pahlevi, whilst attaching himself very much to modern progress and development, has not neglected the spiritual side. He has recognized the necessity of preserving the ancient monuments that remind us of the glorious past, of the Achaemenian Empire, the Sasanian and the Safavid dynasties. He has given strict instructions in this sense, and much time and attention is being devoted to that purpose. A museum has been built in Tehran, where magnificent works of art and the products of the extensive and important excavations will be shown, and I am certain that the capital of Iran will in the near future become a centre of attraction to which many will go to see unique specimens of the art of the country.

Lady Ravensdale's article in *The Times* and her remarkable lecture to us to-night have shown you what interest there is in England in regard to Iranian art and literature. Indeed, the Exhibition of Persian Art in 1931 at the Royal Academy was a revelation to everybody in this country, and served also to stimulate that interest as did the celebration in London of the Millenary of Firdausi in November 1934.

No greater admirers and translators have been found of our poetry. Distinguished English poets like Fitzgerald have rendered the poetry of Iran into beautiful English verse. We owe a great deal to Fitzgerald for having made Omar Khayyam so popular in the West; in fact for having improved on the original.

As a result of all this interest in Iran, a number of Englishmen, among them Lord Lamington, Sir Denison Ross, Professor Nicholson, Mr. Laurence Binyon and others, together with a number of Iranians resident in England, have thought the time ripe for the formation of a Society to be called the Iran Society, which will devote itself particularly to making Iranian art and literature better known to the people of England. It is hoped that the Society will serve as an intellectual bridge between the two countries.

I feel that in this troubled world, in which everything seems to be upside-down, where there is so much tendency to rearmament, it is good that such societies should come into being, societies which will remove misunderstandings and thereby promote the peace of the world.

The PRESIDENT: Our old friend and member of Council, Sir Denison Ross, has recently been in Iran. I will ask him to come on to the platform and address us for a few moments.

Sir DENISON ROSS: It is perhaps inevitable that I should be called upon in a

meeting such as this to add a word or two. I have enjoyed the lecture enormously. I spent many hours in earlier days discussing Persia with Lord Curzon, and it is always a delight to be reminded of the love he had for that country and also of that remarkable book of two volumes which he wrote as the result of his journeys in that country. There is no book so "unsupersedable" as Curzon's 'Persia.'

I would add one remark with regard to the beauties of the landscape and all one sees in the country, and in doing so I will refer to a conversation I had the privilege of holding, in strict confidence, with H.I.M. Reza Shah Pahlevi. I referred to the change he was making in the costume of the people, and regretted the disappearance of the picturesque shepherds with their little conical hats and pale blue coats drawn tight into the waist whom I had seen wandering about with their flocks. The Shah said: "It is not my ambition that Persia should merely be picturesque," and when you recall the changes that are taking place throughout the East I think you will find in that remark a key to all that is happening and a key to the comments made by disappointed travellers. After all, the East has been most picturesque for very many centuries. It is surely time it should be happy as well.

The PRESIDENT: Sir Percy Sykes is with us this evening. He is familiar with the regions covered by Lady Ravensdale's travels, and particularly with Meshed, where he was H.M.'s Consul-General. We should like to hear something from one who knows so much about the country both as traveller and historian.

Sir PERCY SYKES: I started my travels in Persia a few years after the late Lord Curzon, and the only book I had with me on that occasion was his well-known work. I read it from cover to cover more than once, and to that book I owe the foundation of the knowledge that twenty-six years in the country have brought me. I am therefore deeply indebted to Lord Curzon.

I have travelled over most of the country referred to to-night. I was Consul-General in Khirasan for a period of eight years, and I was at Meshed, its capital, when the Russians bombarded its shrine. The next morning I insisted on visiting it with the Russian Consul-General, who strongly objected to my doing so. By good chance, that night the treasury, which had been taken away from the shrine, was brought back, and I received the credit for this. I do not know whether I had anything to do with it. I think it was a matter of *post hoc* rather than *propter hoc*.

Shiraz recalls stirring memories. During the Great War I was invested there by warlike tribes more or less organized by that very capable German Wassmuss, whose life has recently been written by Christopher Sykes.

Of Persepolis I retain interesting reminiscences of quite a different order. I halted there for a day with my troops, and coming away from visiting its ruins I heard Sergeant Jones say to Sergeant Robinson, "Well, at last I thoroughly understand what the Stone Age was." Two Indians, not of the officer class, said in a mournful tone: "How can the Sahib see anything here to look at? There's nothing but stones!"

Isfahan has a tragic memory for me. When I arrived there the Turks were marching on the city, and I was asked to come to the rescue with my tiny force. Fortunately its strength was exaggerated enormously, the Turks retired to Hamadan and I joined the Russian forces. I can recall a review of British and Russian troops at Isfahan, on that same *maidan* which was the polo ground in the days of Shah Abbas. A year later the Russian force had driven out its officers, some of whom they murdered.

My happiest days have been spent in Iran. They were golden days, and one of my greatest friends was Nasir-ul-Mulk, who was at Balliol with Lord Curzon,

When he came over to announce the succession of Shah Muzaffar-u-Din to Queen Victoria he asked that I should be in political charge of him. I visited Balmoral with him and had the great privilege of being presented with him to the late Queen Victoria. He was afterwards the Regent of Persia and the father of the wife of the Minister of Iran, who is with us to-night.

The PRESIDENT: I have now to close the proceedings. I did not mention prior to Lady Ravensdale's lecture that after she had undertaken to deliver it she had a hunting accident, in which she suffered some concussion, and was laid up for a fortnight or three weeks in consequence of it. It would have been easy for her to have excused herself in the circumstances from the ordeal of a lecture; but it was in a great measure as a tribute to the memory of her father and his long association with this Society that I invited and she consented to give us an address, and she would not allow her indisposition to stand in the way. She has indeed been most eloquent and interesting in her address, and I am sure that if Iran has left happy memories with her her narrative has also brought many happy memories to many among her audience. I ask you now to join me in thanking her very heartily indeed for her paper.

AN ALLEGED PLACE-NAME PROBLEM IN TANGANYIKA

IN the *Journal* of May 1935 Captain Grant raised a problem in connection with the name of the river Mkenke in the Kondoa District of Tanganyika. The Society has now received two communications on this matter from officials of the Tanganyika Railway, Mr. N. R. Rice and Mr. C. Gillman.

Mr. Rice writes:

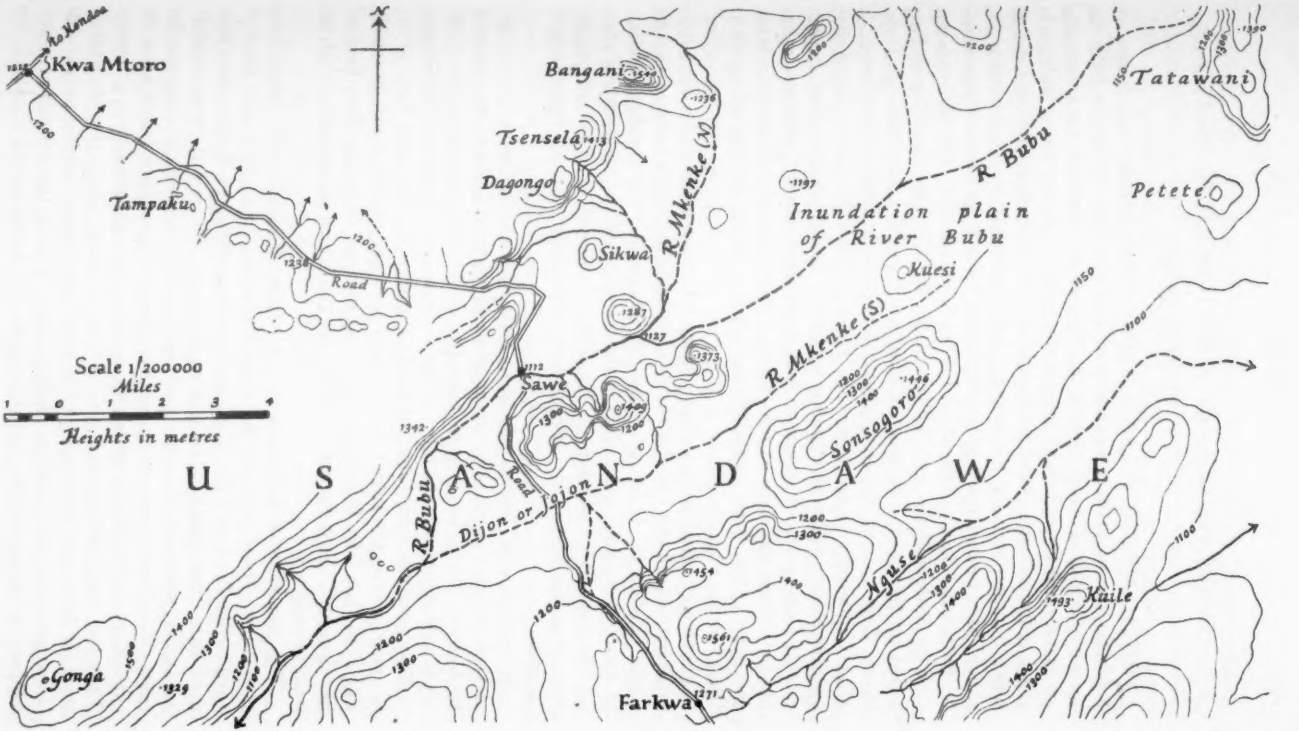
"During a reconnaissance survey in 1930 of the district, I was advised of the problem but my investigations did not support the theory championed by Captain Grant that the river Mkenke crosses the river Bubu. However with the publication of the map in the *Journal* I feel that some further explanation is necessary before a geographical phenomenon of this nature is accepted. I am therefore sending you my map of the area in question. From this it will be seen that there are two Mkenke rivers (which in Ki-Sandawe are known as Dijon or Jojon), one of which (called the Northern Mkenke on the map) rises in the north-west corner of Kondoa District; the other, or Southern Mkenke, rises near Tatawani on the Burungi plains and both join the river Bubu as indicated. During the heavy rains most of the area is under water, and under these circumstances the actual course of river flood water is naturally difficult to determine; but I consider this is no justification for the assumption that one river would follow the course as shown on Captain Grant's map.

"Recently however I again visited the area and actually established the confluence of the Northern Mkenke with the river Bubu, at which point there is a range of low hills separating the Bubu from the Southern Mkenke, thus definitely establishing the fact that the rivers are separate. This later investigation I have also incorporated in the map. It would appear that, as is so frequently the case with African place-names, Mkenke is a generic name for a certain type of stream."

This note was communicated to the Society by Mr. Gillman, who himself adds the following remarks:

"While fully endorsing Mr. Rice's views I take this opportunity to point out the great advance in our topographical knowledge of Eastern Usandawe made by this railway reconnaissance. The map, only part of which is reproduced, is a great improvement on Obst's earlier one (*Mitteilungen, Geogr. Ges.*, Hamburg, vol. XXIX, 1915) and brings out excellently the interesting morphology of the ground. Some of the fracture lines of the central shatter belt, which farther north and south have dislocated country in a very advanced stage of peneplanation, here intersect a surface of a much more pronounced older relief. This old relief consists of that, in East Africa, so well-known type of 'open hill country' in which dissolution has resulted in isolated, steep-sided ridges and hills, separated by flat, wide pediments which merge gradually by great open bays into the surrounding peneplain.

"The map also shows much better than the older one that the Bubu valley here is not a 'notch,' as Obst remarks in his text, but a typical asymmetric tectonic valley with a steep scarp leading up to the high block of upper Usandawe on its north-west side, and on the opposite bank with a much more gentle gradient, studded with the remnant hills of the old relief, and forming the south-eastwards gradually rising dip-slope of the low block of East Usandawe."


to Kondoa
Kwa Mtoro
Tampaku
Road
Bangani
Tsensela
Dagongo
Sikwa
R Mkenke (N)
R Bubu
Tatawani
Petete
Inundation plain of River Bubu
Kuesi
R Mkenke (S)
Sawe
Sonsagoro
Ngusc
Kuile
R Bubu
Dijon or Jojon
Road
Gonga
Farkwa
U S A N D A W E
Scale 1/200000
Miles
1 0 1 2 3 4
Heights in metres

SOME NOTES ON SOUTHAMPTON ISLAND

T. H. MANNING

SOUTHAMPTON ISLAND is about 20,000 square miles in area and forms the north-west boundary of Hudson Bay. It was probably first seen by Captain Thomas Button in 1613. It was however not known to be an island until Captain Middleton's voyage in 1742, nor was it known to be separate from Coates Island until still later; it is therefore not strange that the name Southampton for the island, or first perhaps for the general region, should have been derived by gradual usage from Cape Southampton, named by Button in honour of the third Earl of Southampton. The island was next seen by Robert Bylot and William Baffin in 1615. In 1821 Captain Parry sailed up the north-east coast of Southampton Island and through Frozen Strait, thus proving the correctness of Captain Middleton's statements. In 1824 Captain Lyon sailed up Sir Thomas Roe's Welcome, several times sighting Southampton and landing on Coates Island, where he met a peculiar race of Eskimo otherwise known only from their remains: they may or may not have been the same as the extinct Sedlermiuts of Southampton Island. In 1836 Captain Back, in the *Terror*, spent a winter drifting among the ice along the Fox Channel coast.

But though often visited, little was known of the island and nothing of the inhabitants until the visits of the whaler Captain Comer, between 1896 and 1909. Captain H. T. Munn crossed it in 1919 and was the first white man to do so. Soundings were taken in the sea surrounding Southampton Island by the Canadian Government Expedition under A. P. Low in 1904, but the coast-line was rarely approached sufficiently near to make mapping possible.

In 1922 Therkel Mathiessen spent some time excavating at Kok on Duke of York Bay, and during the winter crossed the island to South Bay, returning by Canyon River. In 1929 to 1930 Dr. G. M. Sutton spent a year on the island collecting birds and other animals. In 1924 the Hudson's Bay Company trading post was established at Coral Harbour by Mr. Sam Ford. During my residence on the island the Post was occupied by Mr. Ford, his son Mr. Bill Ford, and Mr. Bob Renny; in 1934 we were joined by Mrs. Ford and her daughter. Two Roman Catholic priests live at the mission, which was built in 1925.

The remainder of the inhabitants are either Eskimo or half-breeds living as Eskimo. About sixty of them are Ukumiuts, taken to Coates Island in 1919 by the Hudson's Bay Company and transferred to Southampton when the Coates Island post was closed down in 1924. The rest, about one hundred, are Iviliks, who come from the mainland, chiefly Chesterfield to Repulse Bay coast. They were crossing to and living on Southampton Island before the extinction of the Sedlermiuts, though not so continuously as at present. They had very little contact with the Sedlermiuts, whom they despised for their dirtiness and their inability to build good snow houses, to tend their lamps properly, and to soften caribou skins. Two or three Sedlermiuts were adopted as babies by the Iviliks and are still living on the mainland. The

Iviliks are for the most part more provident, better hunters, more intelligent, and distinctly cleaner than the Ukumiuts. Several of the Iviliks are not pure Eskimo, while the Southampton Ukumiuts may be poor representatives of Baffin Land, which may account for the contrast. The Eskimo are now very largely dependent on the Hudson's Bay Company. Without rifles and ammunition they would certainly starve, without tobacco and tea they are miserable. Also the recent decrease in the number of caribou (there are probably not more than 50 on the island and only about 12 were killed last year) has necessitated the importation of skins from the mainland and the use of European clothing. In the winter 1934–35 about 1500 foxes were traded; this was a peak year, sometimes not more than 400 being trapped: about one per cent. are blue, the remainder white; one cross and one red have been caught, which probably drifted on the ice from the mainland. Polar bears are fairly numerous, but less so than formerly. Bob Renny, who went to Walrus Island in the fall of 1934, reported that there was a herd of 2000 walrus there; a lot were also killed near Native Point. During the winter Ringed Seal (*Phoca vitulina*) and Bearded Seal (*P. barbata*) are almost the only game. Ranger (*P. nitulina*) and Harp seals (*P. Groendlandica*) are occasionally killed as are white whales in the summer. On the average one Greenland whale is killed or found stranded in five years. The kayak and the umiak have now given place to the whale-boat and motor launch. Wolves are rare except near the trap lines, where they do considerable damage; they are extremely cunning and seldom killed. The Arctic hare is fairly common in the gneiss country. Two species of lemming and the weasel occur.

Both Iviliks and Baffinlanders drive their dogs in a fan with traces of varying length. The leader is always well clear of the second dog to allow him to turn without hindrance. To turn them to the left the driver says *Aeouk*, to the right *Huhk Ehk*, and to stop *Wuu*. To make them lie down the whip is gently thrown over their backs. To start, the sledge is tapped with the whip or foot, while the driver may say *Heh;* with a heavy load, especially in cold weather, it may be necessary to pull back on the bridle, let go with a jerk, and at the same time pull the sledge sideways.

The wood *komertik* runners are shod with either steel or whalebone. Steel shoeing is always used in the fall and on land in late spring when rocks are numerous, as bone is soon spoiled by scratching. Bone slides far more easily, and ice, put on by means of a wet piece of bear skin, rubbed along it, will not crack off as it will from iron. During the cold weather, mid-November to late March, bone shoeing is usually, and iron always, covered with an inch layer of mud. Chopped out of the ground with an axe, the mud is thawed and broken up; it is usually of peaty consistency and must contain no grit. Balls about 6 inches diameter are spread round the shoeing and about $1\frac{1}{2}$ or 2 inches up the wood. In a few hours the mud is frozen solid, then it is smoothed by planing or scraping with a knife. The mud must be covered with a thin glaze of ice. Providing the sleigh does not bump down on glare ice or hit a rock, the mud will last all the winter. On the average however it has to be patched about twice a week. As the mud is more likely to break on the bows, a strip of walrus hide is sometimes nailed there instead. If during the course of the day the ice wears off, the walrus hide drags far worse than iron; it is

therefore never used on the flat of the runners, though according to Dr. Rasmussen it is occasionally thus used in Greenland.

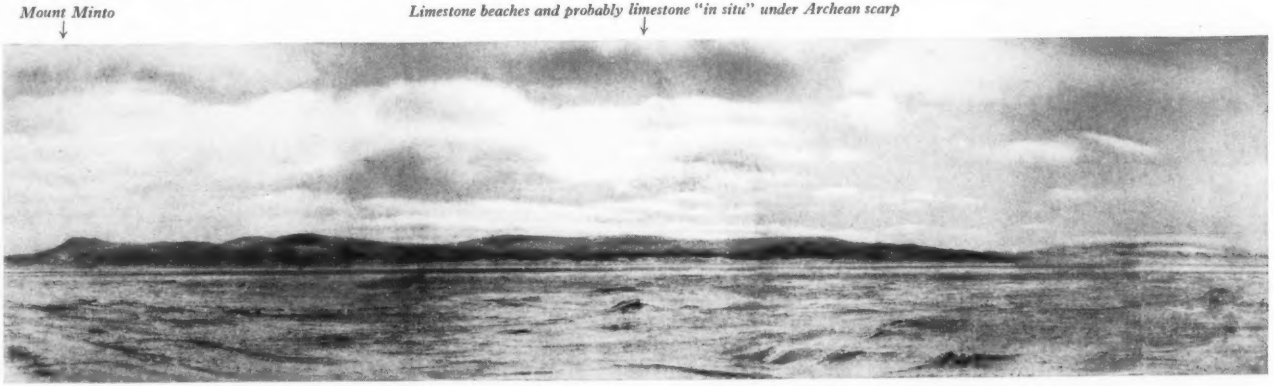
The ice glaze must be renewed daily; except in warm weather or on salt ice, the old ice is planed off before putting on the new. In cold weather the ice must be very carefully put on. If the water is too cold the ice will turn white, and will not slide, if too hot the mud is thawed and gets on the bear skin. With the temperature above zero the water can be almost cold and several coatings must be put on. In spring when the temperature is around freezing point, a slob of snow and water is used or even small pieces of ice cut out with a saw and frozen on during the night. In this way the mud is preserved and can be used even when the snow is wet and rapidly thawing. On the mainland south of Chesterfield where whalebone is scarce, mud is sometimes used well into May. On Southampton Island however most Eskimo are using bone by April, whalebone being more plentiful there.

A well-iced sledge will run as easily at temperatures down to −50° F. as an un-iced one at 15° F. Below −50° F. it is extremely difficult to prevent the ice turning white, and perhaps it is better to use plain mud without any ice; or, as I found best, to ice the bone directly as this does not cool the water so suddenly. According to E. de K. Liffingwell the resistance due to friction of iced runners is $^{6}/_{10}$ that of steel, but the temperature at which the experiment was conducted is not given, and the ice was not carefully put on, so that under some conditions it may be reduced to $^{3}/_{10}$.

Most of my travelling was done alone. When staying only one night in a place I used a tent to sleep in. The chief objection to this is that in order to keep warm and prevent it freezing, I had to take my head into the sleeping-bag, which then became wet from condensation, and after about ten days froze hard and stiff like wood. This is unpleasant and can be avoided by following the Eskimo practice of always using a snow house. To build a snow house is not difficult: in fact I built my first without previously seeing it done; but to build with the speed and neatness of an Eskimo who has done it from boyhood is a very different matter. The method has been well described by Dr. Stefansson in 'Hunters of the Great North.' He does not however make it clear that all the snow blocks are obtained from inside the snow house, so that a third of the wall is made by the removal of the blocks; a good builder will also have enough snow left inside for the bed. According to Dr. Mathiessen the Greenlanders obtain the snow from the outside and perhaps this is true of Dr. Stefansson's Mackenzie River natives. For a beginning at least, a saw is easier and quicker than a knife for cutting blocks, and many of the Eskimo on Southampton Island now use it. Some of the natives can build a house in about half an hour, while it would take me an hour and a half, and I therefore only used one when I was not expecting to move next day. As it is unnecessary to build a snow house bigger for two than for one, two people travelling together would probably find it best to use it entirely and thus save the weight of a tent as well as having the extra comfort. It is quite possible to build and use a snow house for one or two nights even with temperatures above freezing. Also in the fall if there is only an inch or two of snow and the temperature is above freezing, sufficient snow for a small house can soon be collected by rolling snow balls, and cutting these into blocks.

An Eskimo camp at Sixteen Mile Brook, Feb. 1935

Limestone cliffs near Rocky Brook, Dec. 1933



Looking S.W. from Terror Point to Bell Peninsula Hills, 27 April 1934

John Ell mudding a komertik

Observing for latitude on the higher land near Mount Saorre, 26 May 1934

During the winter astronomical sights were taken either by removing a block from the snow house or through a sleeve opening in the top of the tent. During the first winter I had difficulty in earthing my wireless properly, with the result that it sometimes took several days to get a time signal. The second winter I failed completely to obtain time signals, due to the Annapolis long-wave signal, on which I was relying, being discontinued. I also had trouble with my half-chronometer watch, but after I had failed it was finally mended by an Eskimo, John Ell, who filed down a needle to take the place of a broken staff. Though most Eskimo have short, thick, and apparently clumsy fingers, they use them with remarkable dexterity and infinite patience. Patience is an Eskimo's greatest virtue and the most difficult for a white man to emulate. Detail between astronomical positions was filled in by compass traversing. At first a sledge meter was used for measuring the distances, but when the dogs galloped over rough ice or ridged snow it so often broke that I finally gave it up and fell back on timing and judging the speed, which after a little practice can be done with considerable accuracy.

In April 1934 Mr. Ford with two Eskimo and twenty-eight dogs crossed to Chesterfield Post on the mainland to obtain extra supplies; there the dogs caught a disease which killed all but five on the return journey and afterwards spread throughout the island. From four to six days after coming in contact with the disease a dog would become ill and it was only rarely that he recovered. Five out of my six died; the other was never ill. This sickness takes two forms. In one the dog first refuses food, then the back legs become weak and he staggers about as though drunk; later the hind quarters may become completely paralysed, so that he can move only by dragging them. In that case the dog usually dies in three to five days. In the other form mucus is discharged from the nose and eyes, food is refused, and breathing is obviously very difficult. A dog will stand motionless for about half an hour, then fall over, struggle up, and repeat the process as if its life depended upon it remaining on its feet. After one or two weeks, having eaten nothing, he dies of hunger and exhaustion. On the rare occasion when they do recover they are often blind for several weeks. Dogs which are fat and well fed are less likely to develop the disease than when hungry. This is probably the first time the disease has occurred on Southampton Island, though a less virulent form is fairly common on the mainland. Last winter several Eskimo had no dogs at all, which naturally seriously impeded their movements. This disease is quite distinct from Arctic rabies, which also occurs there spasmodically.

I was landed on Southampton Island by the Hudson's Bay Company's ship *Nascopie* in August 1933. The early fall of that year was spent in the neighbourhood of the post, collecting birds and geological specimens, and doing a little preliminary survey work. In November I bought six dogs and a 14-foot *komertik* from the Eskimo. The rest of that winter, the next spring, and the following winter were spent almost entirely in travelling and mapping. The first winter I usually had five or six dogs, the second only three or four, as dogs were very scarce that year. During the two winters about 300 miles were covered in journeys differing little from each other or from other Arctic journeys, so that their detailed description would be tedious in the extreme. Most of the summer of 1934 was spent collecting and studying birds, at a

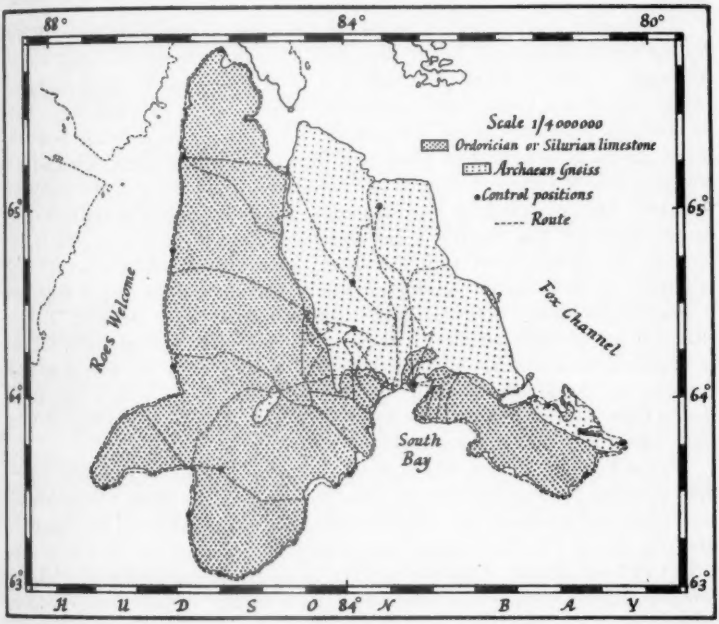
large Snow and Blue Goose colony on the mouth of Boas river. In the fall I excavated two house ruins, one belonging to the Thule culture and probably of considerable age, and one near Manico Point, where the Sedlermiuts developed the disease from which they died out in 1902. About two hundred specimens were obtained for the Canadian National Museum. I continued the survey during the winter. On April 7 I left with four dogs for Churchill *via* Chesterfield, and arrived there on May 13.

Topographically and geologically Southampton Island is divided into two very distinct areas on a line running south-east from Duke of York Bay, the north-east portion being Archaean gneiss, while except for a few hills in the centre of the island the south and east portion is entirely composed of Ordovician limestone. The striking features of this part of the country are the terraced limestone plateaux, varying in area from 1 square mile to 300 or 400, and separated by low marsh lands mingled with raised beaches of limestone gravel and rubble. The plateaux are almost bare of vegetation and composed of angular fragments of frost-shattered limestone; in places these are small and gravelly, but more often they are flags up to a foot in diameter and usually raised on edge. As the limestone is traversed by cherty beds, some areas are covered with fragments from which the calcareous material has been dissolved, leaving many strange shapes. Metamorphic erratics of small size and not necessarily of glacial origin are fairly numerous, but large boulders are very rare. These small erratics may well have been caused by sea ice. Though the detritus is undoubtedly underlain by rock *in situ*, exposures are uncommon owing to the susceptibility of the well-stratified limestone to frost action. The bareness of these plateaux makes them exceptionally good ground for observing earth polygons and the sorting of rocks by frost. The plateaux are seldom separated all round by an abrupt scarp. One, two or more sides may be steep while the others will gradually trail off, both in height and changing vegetation, towards the marshland.

On most maps of Southampton Island there are features marked as "peculiar shed-like hills"; these are of the same formation as the plateaux, only smaller and with steeper sides. The most conspicuous is Kingatuaq (the only hill); two smaller ones near Sixteen Mile Brook are also good examples, obviously homologous with the larger plateaux. Between the head of the Bay of God's Mercy and Ranger River five of these hills are marked. From the coast they certainly appear as five separate "shed-like hills" as only the highest tops are seen and these are often raised and distorted by mirage. Actually they are a definite ridge of hills with but two gaps. The Eskimo name Nuvudlik, meaning "many little points," conveys a better impression of them than "shed-like hills." They follow the usual tendency of the limestone hills to have flat tops and steep sides, but the ridges of some are very narrow and the smaller are more rounded. The plateaux are probably formed by marine erosion of the horizontally bedded limestone, and the same is probably true of the Nuvudliks, though I think subsequent water erosion has there played a larger part, and some peculiar circular depressions at the north end are probably due to underground caverns being formed by water and the roofs subsequently subsiding. Dr. G. M. Sutton, who saw the Nuvudliks from the coast, considered them to be glacial deposits. This I am sure is

incorrect, because, though I have not myself seen rock *in situ* on the higher parts, the Eskimo say it is there; where the river rises, considerably above the plain, it has cut a gorge through solid limestone, and the flat tops and steep sides can only be due to the stratification. I do not think there are glacial deposits of any size in this limestone country; if there were, they would consist largely of igneous rock and thus be easily distinguished.

The marshland which is usually very flat is intersected by raised limestone beaches. The largest and most consistent tracts of marsh are north of the Bay of God's Mercy, between Coral Harbour and East Bay, and south-east of Duke of York Bay. To map this sort of country in detail from the ground is quite impracticable, owing to the number of lakes. The southern portion



of Bell Peninsula and the east shore of South Bay is also limestone and marshland.

The pre-Cambrian gneiss rises abruptly above the limestone country, sometimes directly to the height of 1000 feet, though not perpendicularly. It seems probable that this division is due to a fault running the length of the island and on both sides of the gneiss block, which has been pushed up, the limestone being afterwards denuded from the top, except in small patches. On top the hills are smooth and rolling, and once the numerous rocks are covered there is no difficulty in sledging over them. Glacial deposits are numerous. For about 15 miles inland from the Fox Channel coast the aspect of the country is entirely different. There the hills are higher and intersected by deep valleys, the major ones containing streams which often run through

perpendicular-sided gorges with numerous falls. The hills terminate at the coast in high cliffs or very steep slopes. Sledging amongst these hills is impracticable, except to go through them to the coast by the major valleys; even this necessitates much lowering of equipment down frozen waterfalls, and, as the ice breaks off up to the cliffs, on reaching the coast it is necessary to return the same laborious way. The Mount Minto area of Bell Peninsula is similar gneiss block, but being smaller has not been intersected by canyons. About 10 miles north-west of the post is an isolated limestone area overlying the gneiss; the junction is confused by glacial drift but appears to be unconformable. In all other cases of which I know the limestone and gneiss are divided by a band of marshland, usually with a stream running under the scarp.

The largest river, both in length and volume, is the Boas river. Rising in the highlands behind Atagugaluk, it follows an extremely winding course, through a maze of lakes from which it is at times barely distinguishable. At its mouth it is about a mile across and from 6 inches to 2 feet deep. Here it contains numerous small, flat islands. These serve as a refuge from the foxes, and a large colony of Snow and Blue geese breed there. Kirchoffer is the next largest river and with its two tributaries drains most of the highlands except a narrow strip near Fox Channel. Naturally, owing to the difference in the nature of the country, it has no resemblance to Boas river. Its higher reaches run through deep rounded valleys, then for the last 25 miles through a shallow gorge with rather sloping sides. Throughout its length there are numerous rapids and in the last part two waterfalls about 35 feet high. Ranger River is considerably smaller; it rises in the Nuvudliks and probably follows a rather devious course. In summer several Ranger seals can always be seen basking on the sandbanks at its mouth; they also go up it to a lake about half a mile from its mouth. Cleveland River, which flows into Duke of York Bay, I have seen only in the winter: it is probably not very large.

To the Eskimo, Kikuaq and Sixteen Mile Brook (Kok) are the most important streams. Sixteen Mile Brook flows from a large lake about 8 miles inland, and many fish (probably Greenland charr, *Salvelinus stagnalis*) are caught in the run during the fall. Kikuaq is considerably larger; it rises in a small lake about 25 miles inland. This lake is fed by an underground stream which keeps the lake slightly warmer than others during the winter: in fact the ice is seldom more than a foot thick and usually bursts in March or April, when fish are sometimes thrown out on to the ice. Though they have not been so plentiful there for the last few years, probably owing to the number that have been taken out of it, it is still the best fish lake on the island, due presumably to its warmth. There is also another fish rather larger than the above and having a bright red belly and usually whiter flesh than this charr. It appears to live in landlocked lakes; whether it is a different species I am not qualified to judge, and I have no specimens. One mile east of the mouth of the Boas is a small stream flowing from the north-west end of the Nuvudliks. In early November there was only an inch or two of ice on it, and near its source there was running water. The stream runs underground for about 200 yards from a small lake. This lake also would not bear my weight on November 5, when the ice on other lakes was about 2 feet thick. The Eskimo say that this stream breaks

out even in mid-winter. This is implied by its name, Numikuittuk, meaning "never healing." There are two other rivers of this name, and, as they are in limestone districts, both probably owe this characteristic to their subterranean sources. The continual overflow causes the ice to form to great thickness and remain long after all other ice has thawed. In February the Canyon river was cracking and water running on it, but this was due to snow drifts pressing down the ice, and is a common phenomenon on the mainland, where lakes and rivers are deeper.

Raised beaches up to at least 400 feet are numerous, and particularly well developed in the limestone country. Above about 100 feet the material is very angular, but this is probably only due to the extra time it has had to withstand frost. Quaternary fossils occur up to 450 feet near Itiujuak. They possibly occur higher, but less commonly, as the barren, rocky hill-tops are unsuitable for their preservation, and the same is true of the shattered limestone and marsh areas. A Quaternary deposit about 25 feet thick has been cut through by Canyon river near its mouth. This is probably the one mentioned by Dr. Mathiessen. It contains numerous fossils, and a collection of these and the superficial ones was made at various heights. On the rather low-lying gneiss land near the post, and elsewhere, there are peculiar circular patches, usually about 3 feet in diameter, of white calcareous mud somewhat similar to the mud visible at low tide. They contain Quaternary shells. The surface of these are convex and the mud appears as though it had been boiled or been pushed up. They are similar to a flattened mole-hill, and twenty or more will often occur in an acre. Presumably depressions in the gneiss were in Quaternary times filled with mud. Over this area the usual vegetation has grown. But as the mud holds considerable water, it will be very susceptible to frost which pushes the mud up over the vegetation.

As in other parts of Canada ruined Eskimo houses of the Thule type show evidence that the land has risen in recent times. There are two groups of houses in Qorhlortoq Bay and at least one in the Bay of God's Mercy which I am sure would not have been built had the sea not been in 15 or 20 feet higher at the time. Also in the Bay of God's Mercy is a Sedlermiut village last occupied in 1902; from this a pathway has been cut through raised beaches to the sea. Although it is possible that they have been formed by exceptional high tides with a strong south-west wind I think it more likely that the sea has retreated since the use of the path. The numerous falls and rapids in Qorhlortoq and other streams are of course another indication of recent uplift.

Since 1933 simple meteorological observations have been taken by the Roman Catholic Mission for the Department of Marine. As my observations would of necessity have been somewhat irregular while travelling, I did not attempt to take any. During the winter at least, wind very often appears to be of extremely local occurrence, even in the low flat land. Eskimo arriving at the post from Native Point (Nunagriak) constantly report high drift where they have come from, while there is a complete calm at the post or vice versa. One day I went from the post to Sixteen Mile Brook, opposite Qorhlortoq Point. I went from perfect calm, clear weather, into a wall of high drift from the north-west; on returning three or four hours later the edge of the drift was just as distinct and had only moved 200 yards. Though there is no obvious

reason why it should be sheltered there appears to be considerably less wind within a radius of 5 miles of the Post than in the surrounding country. Qorhlortoq Bay and Itiujuak are usually windy. It is rare that the snow surface remains the same over a distance of 50 miles. During the winter calm weather predominates and complete calms are probably spread over very large areas. Local storms lasting twelve to twenty-four hours often occur without much change in barometric pressure, though for more widespread storms, lasting three or four days, there is usually a distinct fall in the barometer.

On Southampton Island the lakes freeze and the first permanent snow usually falls towards the end of September. The bays are usually frozen by mid-October. It is possible to travel by sledge over land until mid-June and in most places on the sea-ice until somewhat later. The ice goes out of Coral Harbour with great regularity in mid-July and from Duke of York Bay probably not until August. On the average, pack-ice fills Coral Harbour for about a week in the late summer. It is often old, heavy ice from Fox basin. Roe's Welcome has now frozen for the last five winters. Before that it appears more often not to have frozen. When once frozen, it does not break up until June. Owing to the currents the ice is usually rough, and the narrow part in the north never freezes. Frozen Strait has not frozen since 1923.

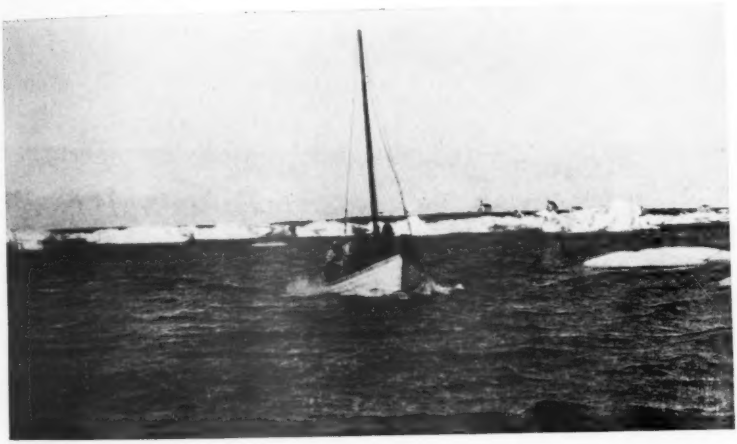
Any one who has undertaken an expedition of this kind will realize that it is only made possible by the assistance in England of the Royal Geographical Society and those connected with it, and abroad by the Government and the natives of the country. It would take too long to thank by name all those, both in England and Canada, who helped me with advice and encouragement. But it is quite certain that I should never have left England without Dr. T. G. Longstaff's assistance. For an inexperienced white man to live alone on Southampton Island without the help and co-operation of the Hudson's Bay Company would not be practicable, and without the active help in most diverse ways of Mr. Ford and Mr. Renny, as well as the Eskimo, my residence there would have been almost useless and certainly unpleasant. The Royal Geographical Society lent me instruments, the Canadian Geodetic Survey a wireless receiver, and the British Museum supplied collecting material.

APPENDIX ON THE MAP

Control positions.—Owing to my inability to get time signals only three longitude positions were obtained astronomically. A few positions in the neighbourhood of Coral Harbour were fixed trigonometrically. Owing to the impossibility of building beacons and the lack of definite natural features there is probably an error of a mile in the position of Koujak and Conical Hill. The mean of three readings for the base with a steel tape was 1469·2 feet. The longitudes of Duke of York Bay, C. Munn, C. Kendall, and Nuqsharngnaq were taken from the Admiralty chart. The longitude of Sea Horse Point was obtained partly by estimated distance and partly by latitude azimuth traverse, the error is therefore considerable, but I think less than if it were taken from the Admiralty chart.

Latitudes were obtained by altitudes of Polaris, or circum-meridian altitudes of the sun at nineteen places, when possible more than one set of readings were taken, and in all cases these agreed within 1′. The error of the watch was obtained astronomically before and after the observation if possible. My position for

Looking W. from Mount Minto, April 1934



Grounded pack ice in local harbour, 1 Sept. 1934

S.E. end of Nuvudlik, June 1934

A rapid thaw, 18 June 1934: Nuvudlik in the distance

Kirchoffer Ruin, 18 January 1934

A windswept limestone plateau near Roe's Welcome, 13 March 1934

the H.B.C. Post and that used on the map was 64° 07′ 47″ N. and 83° 10′ 59″ W., the Geodetic Survey station (C. H. Ney, 1935) approximately 100 yards south, is 64° 07′ 46″ N. and 83° 09′ 43″ W.

Contours and heights.—Heights were obtained by one aneroid and controlled by observations of a mercury barometer, taken by the Roman Catholic missionaries for the Meteorological Service of Canada. The contours have been put in with the aid of these aneroid heights, but as far too few readings were taken a great deal has been done by estimation on rough sketches made in the field. The result is that they cannot be relied on as much more than form lines showing the major features and an error of 200 feet may be found in several places, particularly in the northern part of the high land.

Rivers, lakes, and marsh land.—As most of the mapping was done when there was snow on the ground it was not possible to map the lakes, and even in summer it would be very difficult, because where there are the greatest number of lakes the country is so flat that it is almost impossible to view them. The larger lakes between Itiuarshuk and Itiujuak were mapped from the top of these two points during the summer, and I have no doubt that there are a great many other places on the island with just as many lakes, especially inland from the Bay of God's Mercy up the Boas River.

There is little difficulty in tracing the course of the rivers, except in the very flat land, even in mid-winter, but it is difficult to decide on their relative size. The volume of water they contain naturally varies enormously with the seasons: what is apparently a big stream in the spring may be almost dry in the late summer.

The few areas of grass marsh land shown on the map have been seen in the summer and early autumn. I am certain that a great deal more of the low land is very marshy, but naturally it could not be satisfactorily distinguished in the winter.

Coast-line.—All the coast-line except Coral Harbour and a piece between Nuqsharngnaq and Ranger Brook was mapped in the winter while travelling along it by dog-team. It is probable that some of the small detail on a flat coast is missed in this way. When working from a whale-boat in the summer the reverse is liable to result. The coast between Nuqsharngnaq and Ranger Brook was mapped by the latter method, and the difference in appearance between that and the winter work was at once obvious on the large-scale plotting-sheet.

Other probable errors.—It is possible that Sadligutak and Salmon Pond should be 5 or 6 miles west-north-west of the position shown on the map. The error may be due to the longitude of the west coast being incorrect or to local compass deviation which appears to exist between Sadligutak and Rocky Brook.

There was a certain amount of doubt where the dog-team and boat traverse connected at C. Low and hence there may be an error due to overlap there.

Names.—All the new English names used have been considered satisfactory and accepted by the Geographic Board of Canada, but the Eskimo names were rejected. But as these names are used by the inhabitants and may prove of use to travellers, I have shown them on the map and sometimes used them in the text of the paper.

When an English name is accepted the Eskimo name is sometimes put in brackets; where there is no English name the Eskimo name is given alone. The Society is indebted to Professor Thalbitzer of Copenhagen for his help in attempting a reasonable and consistent spelling of Eskimo names. In the list given below it will be seen that Professor Thalbitzer would have preferred to

use long signs over some of the vowels; but since these are not in accordance with the use of the P.C.G.N. they have not been employed on the map.—*Ed. G.J.*

Author's original spelling.	*Professor Thalbitzer.*
Aivik	Aiviq
Ettegogalok	Atagugaluk
Imekotailak	Imerqutailaq
Itiuachuk	Itiuarshuk
Kashigealik	Qashigealik
Kidluak	Qitluaq
Kikitaoyak	Qikirtauyaq
Kikooak	Kikuaq
Kingalartok	Kingalartoq
Kingoak	Qingoaq
Kokshourtok	Kōkshurtoq
Koliktalik	Quliktalik
Kudlutuk	Qorhlortoq
Kuk	Kōk
Mokyungakvik	Moryongārvik
Nalojoak	Nalojoaq
Neakoktaktonyok	Neaqortartujuk
Nokshangnak	Nuksharngnaq
Noomikuituk	Numikuittuk
Noovagriak	Nuvariaq
Noovoodlik	Nuvudlik
Ooacaoorulik	Uakaurulik
Ovuatalik	Ovuartalik
Shikmik	Shiqmiq
Tuktutuk	Tuktutoq
Tunikmuit	Tunirmiut

LIVING IN ESPIRITU SANTO

T. H. HARRISSON

DR. BAKER has already given a full account (1935, p. 209) of our joint work on the Oxford University New Hebrides Expedition, for the six months August to January 1933–34. In February 1934 the expedition returned to England; some one had to stay, and feeling satisfied with the life I volunteered, and was left in charge of the expedition's base at Hog Harbour, where I was joined by the Australian member of the expedition, Jock Marshall. We were to complete the year's breeding season and meteorological observations, which had been the primary objects of the expedition.

I did not however spend all of this time at Hog Harbour, but made expeditions all over the island, including those parts not previously touched by the expedition. Every few weeks I returned—to assist or relieve Marshall. Thus during my six months as unofficial member of the Oxford Expedition I was able to cover new ground.

Though primarily an ornithologist, I accumulated much anthropological information. I here concentrate on the south Santo–Malo–Omba–north Malekula area of the central New Hebrides, which have been the least described. The accounts of Rivers (1913) and Baker (1929, p. 305) cover the Banks Islands and north-east Santo; Deacon (1931) and Miss Cheesman (1933) have described south Malekula; Layard the Atchin-Vao-Walla islets (forthcoming); and Pentecost has been worked by Tattevin (1926). My more technical anthropological data will be published elsewhere, as also a complete human census of all these islands, and a great deal of ornithological material.

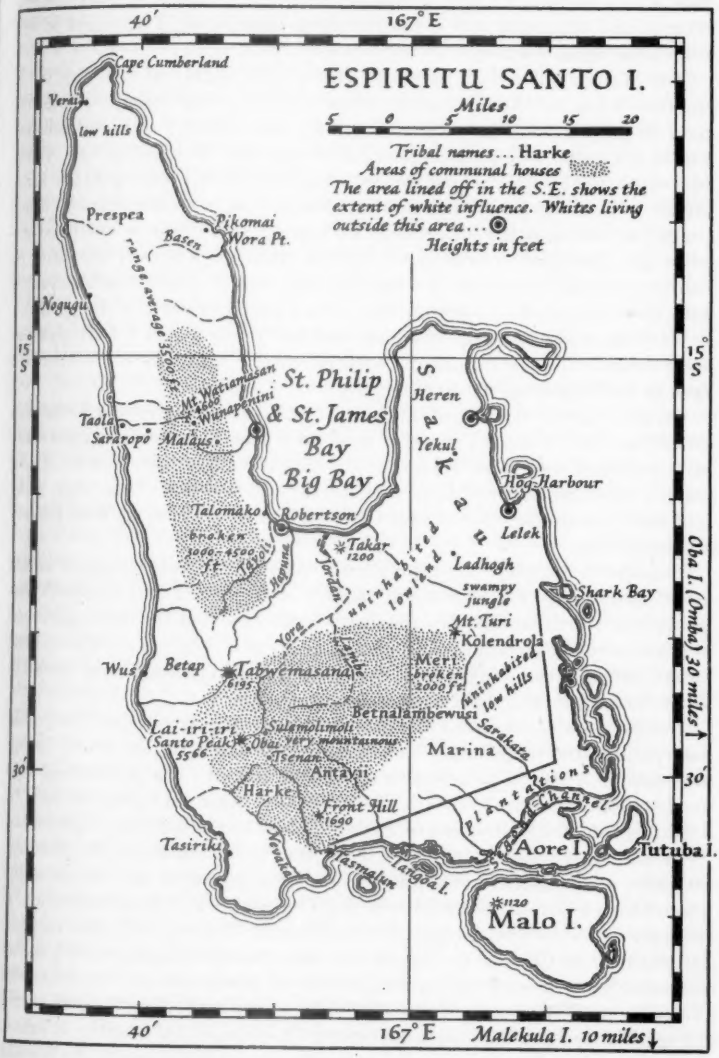
Inland in the larger islands of the New Hebrides the natives, dark-skinned, curly-wooled Melanesians, live in a primitive way. Though the purely material and physiological effects of even passing white men along the distant coast have been so great that no tribe keeps all its original culture, *e.g.* stone axes, the mental upset may be slight; many rituals and the psychology behind them remain unimpaired. Government reports describe these areas as a "closed book" (Joy, 1931). Baker (1935, p. 209) remarks that "the natives of the interior of Espiritu Santo are scarcely influenced by the white people on their shores, and there are few places in the world to-day where primitive society can be studied so well as in the interior of Espiritu Santo." In the interior of Malekula conditions are even more primitive, for cannibalism and magic, first traits to go down before white influence, there survive and thrive. That "savagery" should continue within never more than 25 miles of the sea, in two places within 10 miles of wireless station, hospital, and government post, is astonishing to those who are unacquainted with the Condominium. The whole white history of the group, since Quiros discovered Espiritu Santo and thought it was the Australian continent in 1606, right up to the present time, has been one of cultural and physical sabotage, vandalism, exploitation; a savagery exceeding anything within the natives' imagination or experience. And as Bishop Wilson says: "I suppose no place in the world is so badly governed in the interest of the native as the New Hebrides." Therefore the natives have grown to distrust or to

hate the white man; and this has helped them to preserve more old custom and habit than anywhere else in the Pacific. From the ruthless blackbirders of the last century they got firearms, from the modern planters illegal ammunition; so that as well as being formidable in their mental opposition to white interference, they are formidable in their physical opposition, as interfering whites and one whole naval expedition have learnt to their cost. The bushman now is left alone by the administrator; the missionaries no longer earn the title by trying to convert the heathen, but devote themselves to useful service among the coastal peoples. So long as the bushmen interfere only with each other and keep away from the coast, they may do more or less as they please.

Obviously then, a white man wishing to travel and work in these islands is up against a serious obstacle. He cannot rely on the white man's prestige. He must make his own. He sets out alone, and if he is wise unarmed, without any support (indeed the opposite) from his fellow-countrymen. There are two ways of getting on such terms that you may come and go, look, and gather, where you will: by presents and by friendship. You can do without the first if you are clever with the second; without the second you can do nothing; for you cannot buy a Hebridean if he does not like you. The way to be liked is to keep your promise, to laugh, to tell a story, eat widely and well, show yourself physically an equal, be interested in their arts and in their pigs, observe scrupulously their own tabus and good manners, and pat the children's heads. Patience and a certain low cunning are assets valuable to a visitor. The more you can give, the more they will excuse, for they are primarily an acquisitive people; but to gain a lasting friendship with a real insight into natural behaviour, it is perhaps best to have nothing to give. When I was on my own I had practically nothing; in a year's bush travels I spent altogether the equivalent of about £4. Inversely to my poverty I had to develop my native sense, my understanding and sympathy. Without tinned meats and torchlights one has to come off the high horse and pig it with the people, live *in* the country rather than *on* it. I spent about four hundred nights of my apprenticeship in native villages under native conditions, walked at least 4000 miles, and did about 500 miles in outrigger canoes. Canoeing is a very good way to gain the respect of the coastal people.

I found that I could live and thrive on native foods. I did not eat a tin of meat for months; yet our expedition had previously considered that "all the meat required should be brought in tins; and if no camp oven is brought an abundance of biscuits is essential, since the natives have no equivalent for bread." Actually it is always possible to get meat; fruit-bats cooked in the native oven are good; wild fowls and pigeon abound, and the natives readily procure them with snare, arrow, or gun; wild pig-hunting is an exciting sport and cannot fail to bring in a pig any day; prawns, eels, and fish abound in streams and may be speared without difficulty; there are fresh and salt-water shell-fish, at some seasons sea-worms, turtle and birds' eggs. Manioc is a good substitute for bread, and an astonishing variety of foods are disclosed to the stranger when once he shows himself interested, hungry, and disinclined to eat separately in "fashion belong white man." But if a white adopts native food habits he should adopt them all; he should eat maggots whether he likes

them or not, and eat when the natives eat—twice a day usually, the big hot meal at dusk; the point where I varied from native procedure was that where there was running water or coconuts I drank several pints a day. To this I



attribute my immunity from blackwater fever, which has killed other whites who have lived long on the lee side of Santo or Malekula. Similarly we, as an expedition, found that "malaria is scarcely avoidable during a residence of

any length of time, though serious attacks may be warded off by taking five grains of quinine daily" (Baker, 1934, p. 12). I attribute our early malarial bouts in part to our largely tinned diet unsuited to the climate; during one year I took no quinine, and though living rough in unhealthy areas, I had no fever (I had sunstroke once). On the other hand, when I went back on to a tinned diet again I was sick.

The natives will usually invite the stranger to partake of their fare, but if the traveller is not liked he may be refused all food, even for sale. It is always hard to get porters, but never impossible; war, sorcery, and unfriendliness can be got round with patience, but travel with natives is seldom easy. I gave up porters in the end, carried my own rucksack when I wanted it, and had a friend as guide or sometimes no one, though this is a difficulty with dense jungle, no views, paths ill-defined. To live for some time in one place one must give the chief a few sticks of tobacco, then show oneself interesting or useful; medical knowledge is most valuable. On a purely business basis a yam is worth a stick of tobacco, which has a currency value of threepence; a day's work is one shilling. My long hair and the fact that I wore no shoes were contributory factors in dissociating myself from the white man as a species and in gaining native sympathy.

On the whole I think I can fairly say that I became as good a Melanesian citizen as a white could become in so short a time. I learned by experience, not by ear and note-book alone, much of their character, culture, most of their methods and habits, prejudices, and morality, dances and drum-beats, hopes and fears. Of course I was always a foreigner to them; but they were not very foreign to me.

In order to complete our expedition's study of the Santo people I worked pretty thoroughly over the southern half of the island and the north-west peninsula, which we had not touched; I also revisited the other parts, and was able to make a complete census and study of the native population (total 4100). Before describing this I must draw attention to several travels in Santo which appear to have been rather overlooked.

In 1885 Douglas Rannie (1912, p. 164) went "fifteen miles up" the Jordan river, and found no people. Prior to that, Willie de Lautour, son of George de Lautour, a famous pioneer planter on Aore island, "was accustomed to go for long journeys with them (natives) along the coast, and away through the bush up into the mountains of Santo, and he never had the slightest fear even among the wildest people." Both men were murdered for shootings in 1886; a consequent naval punitive expedition hanged the culprits at the place which is now the headquarters of the Seventh Day Adventist Mission. A strong French party with thirty porters, botanist Ollivier, and leader Largeau, left the Segond Channel in August 1901 and crossed the island to Big Bay in six days. They crossed the Sarakata river to its headwaters and the tributaries Talemba and Wuranemi from the west, going respectively north of the villages Sanapo and Teloma, now extinct. A considerable number of natives were encountered, largely hostile, specially around Kalakara on the Wovafel river flowing north-west to the Jordan, to the north of the table-topped hill called Tarakar (Takar), which is clearly visible east of the Jordan from Big Bay and is the hereafter hill of the Sakaus. Here they met with particular

opposition: "Les collines d'alentour retentirent d'un bruit semblable, qui se communiquait de villages en villages." There are now no people in this area. The party later crossed from Tasmala (extinct) on the west coast, south-eastward zigzagged to the Tapola (Tavoli) river, and then north-east over the watershed to Batourak and out at Talomako in Big Bay. They did not see Mount Tabwemasana; they passed north of the route used by Montégu and Renault in 1911 and along much the same one as that followed by me on my way back from the ascent of Mount Tabwemasana in 1933. An account of this trip and a crude but useful map is given by Collingridge (1903). In 1913 Speiser went for ten days from the mouth of the Jordan inland nearly to Mount Turi and back. He encountered a degenerate and sick population, fifty men, twenty women, and three or four children; acquisitive and unfriendly, infested with "loathsome creatures" (1913, p. 140). This part is now depopulated.

At the end of March 1934 Marshall and I had planned a short trip to the mountains in the south-west corner of Big Bay, rather north of the route which I had previously used on a trip from the west coast to Big Bay, when I had found a very rich fauna. A hurricane delayed us at Hog Harbour; it upset the bush Meteorological station, removed our living shelter, and damaged my hut. We were therefore delayed in our departure. When we had cleared up the mess we borrowed the Presbyterian Mission launch and went round to Big Bay. The post-hurricane swell was running surprisingly great in the Bay and it was after dark before we got inshore. I was unable to pick up the lights of the solitary planter's house, and only after much difficulty did we locate it by barking dogs. As it seemed that all was not well ashore, we landed in the collapsible boat, which collapsed splendidly as the waves broke on the stone beach; that cost us bruises which kept on as sores to hinder our movements long after. We found that Robertson's place had been almost destroyed by a series of great waves on the morning of the hurricane: he had lost personal property, cattle, and coconut trees. I therefore returned on the launch to get supplies and clothing from our camp. Our trip thus disorganized again, Marshall went up to a hill village at 3000 feet to do a few days' bird work until my return. Then, as one of us had to be back at Hog Harbour for breeding-season work in the middle of the month, and as I had put in several months' work without a holiday, Marshall returned, and I made my first long solo trip to explore the north-west peninsula.

Leaving Tavunemalo, a village about half-way up the west side of Big Bay, I travelled with two natives up the Natega river, which, like all rivers on this trip, was in flood, deep, fast, and unpleasant to cross. After about 12 miles we struck north-west over low foothills and through the village Malaus at 1000 feet. At Malaus there were two small areas of cane grass, whose distribution is peculiar; it occurs also on the hills behind Wora point, more extensively on the west coast between Wus and Mount Tabwemasana, and on the south side of Mount Turi in south-east Santo, at points all between 1000 and 4000 feet. On Malekula cane occurs only in the north, between 100 and 2000 feet.

In the wet season the cane reaches 10 feet high. Paths are overgrown so that one must force a way through the thick clumps, receiving an infinite number of tiny cuts from the sharp grass blades. Above 2000 feet was a coral

outcrop; and flame trees (*Metrosideros collina*) dominate the dense damp montane flora with birds such as the parrakeet (*Charmosynopsis*) and the mountain babbler (*Cichlornis*). Here, as elsewhere on the east side of the peninsula, mountain life starts lower than usual, probably owing to the low cloud-line. The village Wunapenini, where I spent the first night, was in a pocket between 3000-foot hills, and *Cichlornis*, a genus known only from Santo mountains, was common just above the village. Life of all sorts swarmed in this beautiful valley, which is that of the biggest river in the area, reaching the sea at Malawus. I later found this to be the best route for reaching mountain areas in the shortest time, and it would be suitable for future workers.

Although the coastal natives have a strict male-lodge system, the Wunapenini area has no club houses, both sexes sharing equally in all dwellings, as also in the Yora–Santo Peak area. This undifferentiated village organization is not previously recorded in Melanesia, where men's lodges, tabu to women, are characteristic. I found that there is no lodge nor any house for female segregation at menstruation over almost the whole mountain area of Santo; separate pig-houses are also rare, and life is communal in the extreme. Dogs abound, mangy half-starved curs, teeming with fleas, kicked and cursed by every one, but useful for pig-hunting, in which they play an essential part by surrounding the pig and enabling it to be speared. Each family has its own fireplace and patch of the house; but there are no strict or visible divisions. A village may be composed of one or several huts, large broad ones with a tiny square entrance at each end, and a tendency for the women to use the back entrance. There is a bare earth patch in the village on which is a stone table and certain woods connected with pig-killing rites.

The communal house system is a remarkable feature of interior Santo, which should be studied more closely. For the man interested in native life, the communal villages are valuable, because one is brought into close and continuous contact with all aspects of daily life and of native behaviour. Amusement and interest are greatest where the whole village shares its meals and stories at one time, one place. The women have a comparatively high status and are notably alive. In men's-lodge areas the stranger is rather isolated from some of the deepest, particularly from the feminine trends. Whereas elsewhere there is a strict segregation between sexes in cooking and eating, these people have met the conveniences of their particular case by a more elastic arrangement. There is one "fire" exclusively for men, but another at which men may share with their women and children at meals. The men's fire group look down on the men at the mixed fire, and the latter cannot drink *kava* nor share in any pigs killed by the former. This is one of those rare compromises in the anti-female attitude of the Hebridean. Yet the character of these inland folk is not noticeably different from that of the coastal people, except that perhaps their hilarity is less restrained.

From Wunapenini I crossed the great ragged backbone of the 4000-foot and higher range which runs north from Santo Peak and through Mount Tabwemasana in a chaos all the way to Cape Cumberland. Few natives travel this way, and the track had been further obliterated by the hurricane and by subsequent major landslides. We spent two unpleasant, exhausting days cutting, crawling, climbing the up and down to Sararopo, 1000 feet above

the west coast. Here there is a fair amount of sandalwood, but with no one to cut it the trade is almost extinct. In a few years, with the population decreasing as it is, quite a rich reservoir of the wood should be formed. Damar, the giant gum pine, occurs here and there at about 3000 feet, single huge trees dominating the landscape. The natives love to put a match at the tree foot and see the flame run up the gum lines as a stream of fire. They use this and another sort of gum for lights at night, but more usually split bamboo and cane bundles.

The people of the area were distinctly pygmoid, shy, and particularly suspicious; no one could talk any language we knew. They had no club house, but feather arrows and shell beads round their waists. They are widely known as Waslulu, the owl clan, and are mixed up with mythological dwarfs and tree-devils. A few days before my arrival they had murdered with axes an old man whom they believed to be causing death by sorcery; this was the first sign of a mild influenza epidemic which passed all over the western inland half of Santo, killing about one hundred people.

I reached the west coast at Taola and for three days followed the coastline north to Cape Cumberland, and then south again into Big Bay, making excursions up the valleys for census information. The west coast going was quite good, sand and stones; it seldom rains, introduced cactus flourishes on the sands, the numerous rivers are shingly and shallow. On the east side every river was in flood; there can hardly have been less than a hundred between Cape Cumberland and Robertson. We could not cross the Basen river, which was in terrible condition, and so were delayed there. All my bird specimens got wet all the time, and in general travel in that area was a miserable, mosquito-ridden business. Floods are a serious handicap to travel in this section. I saw at Prespea the ancient pottery being made by one old hill woman, the last who could make it. Rannie (1912, p. 166) noted clay figures also in 1885 on the west coast, where he thought the people the most intelligent, best housed, but worst clothed of any he had seen. Speiser in 1913 found pots being made only at Wus and at Prespea, so for a long time the art appears to have been of limited distribution. Potshards are found in many islands, sometimes in great quantity. On Malekula they are common, prehistoric in origin, and attributed to the mythological white folk, the Ambat (Deacon, 1934). In the south of that island the pottery was made in coils with crude geometrical designs, but in the north-east was finer. The Prespea pots are made in coils on a simple form of potter's wheel, often with handles tapering up from a small plain base. The Wus pots, which are also made by the women, are simply moulded with a bamboo knife; they can easily be recognized by an invariable broad base with a circle of notches, and the lip broad and sloping outwards. The occurrence of these two very different techniques only a very few miles apart is very significant. Much has been written about Pacific pottery; a full analysis of theory and knowledge to date is given by Schurig, who follows Haddon in adducing two entirely separate cultural diffusions: coiled and moulded. But Santo pottery does not seem to correlate very well with any such diffusion. These pots are bartered to and fro inland as far east as the Yora and Lambe valleys, their value increasing with the distance, from a sucking pig (two shillings) to a recurved tusker (£6). They are used in

cooking, but not for storage; and they have a certain scarcity value. Elaborate tabus are observed by the potters, and these are still kept up in the mission village at Wus. Nowadays the young women show little interest and less ability in the art, and even those who really try seem unable to make good pots. I have noticed the same thing with the Sakaus, who appear actually incapable of making or copying their remarkable buttock blocks that used to be worn by all their men. In these arts and crafts religious tabus and ideals play a most important part; it is on them that perfection depends. And though even the Christians may still observe the outer form, the decay of the underlying belief directly affects the artist, though he is no more than a traditional imitator of the simplest art forms. One thinks of the great religious art of the fourteenth century in Europe; without the old faith, the old application is impossible. At Vaselia I was present at a typical dance—men in the middle move forward slow, then fast, pause, back, pause, women outside stamping; the special feature was the excellent music provided by pandean pipes alone.

There are no whites anywhere in this area owing to lack of anchorage, too much malaria, elephantiasis, and blackwater fever. From Tasmalun in the south-west round to Big Bay there is a coast-line of some 150 miles without any white man, despite an almost continuous belt of valuable agricultural land between the coast and the foothills all round. Native foods abound; never have I seen more pigs. The number used in the chief-making rites of the graded society is larger than anywhere else in the group. Taro gardens are cleverly irrigated by diverting rivers with dams and bamboo drains on to terraced hillsides with stone parapets, or to level places divided by banks and ditches into a chequer board of beds. Some of these gardens, extending for more than an acre, with crotons, gingers, and dracaenas along the ditches, are beautiful. Taro is the staple food all over central and north-west Santo, yams taking a secondary place; elsewhere yam is the staple, and taro only thrives where there is a very high rainfall. The native population is scanty except on the north-west coast; whole valleys once populated by one or several tribes are now empty. I estimate from much data collected that there were once at least fifty thousand people here; there are now about one thousand, mostly coastal and missionized, the whole slowly but steadily decreasing. Over fifty years ago this area was the scene of the Presbyterian Mission's first effort in the group, and many villages were Christianized. For many years now there has been no resident missionary, and visits from the one living far away on Malo island have been most irregular. This is the worst thing that can happen to natives: that they leave heathenism for Christianity, but are Christian only in lukewarm form. They have none of the ambition or morality of heathen or Christian, but are hopeless, negative folk. It has been demonstrated over and over again that the New Hebridean cannot run his own missions. And whereas the Christians closely supervised by a missionary are at the present time invariably increasing, and the bush heathens invariably decreasing, these semi-Christian folk are dying out the most rapidly of all.

Surely the missions have an obligation to tend their flocks; it is not enough to convert and leave it at that. When I visited west Santo the mission stations there had not seen a white man for a year, and they were annoyed about it. And owing to the copra depression, no traders had been near them, this coast

being too dangerous for ships to make journeys for small profit. So there was no money for shirts or calico, essential uniform of mission boys. There were signs of a new wave of heathenism in consequence, and heathen dances were reviving. The teacher Daniel of Verai, the best man I had with me on my Santo travels, said: "We want to be Christians and be good and prosper. But we have been forgotten here by those who made us what we are, and we must now make our own way as best we can."

Interesting was young William Cowo of Taola, the only man in Santo who has reached the state of living as acting middle man in trading between white and brown. He has a fine wood-and-iron house, changes his clothes frequently, fed me on rice in tea-cups. He knew more than I did about engines and French; and conversely he alone in the area could make good bows and arrows, for which there was a great demand—an indication that the further development of mechanized civilization among the natives may prove as satisfactory an art stimulus as the old religious one. Cowo pointed out to me that a beard which I wore was not the mark of a Christian; he pressed upon me his safety razor and his assistance in removing the growth. In the bush there are still primitive villages, especially in the valleys which run down to the sea at Wora Point; these people also have houses by the sea which they visit occasionally.

The Wora area has the men's lodge open at both ends, with the floor divided by bamboos into separate partitions for each grade in the rank society and its associated fire; this system has spread northwards up the west coast from Malo. To give some idea of the life of a stranger here, and its complete difference from that in the communal hill area, I give the following note made at Pikomai in April 1934:

At 1-yard intervals on the floor of the lodge is a bamboo laid across the whole width. There are eleven such, making divisions from no-pigs-killed and Suslagal grades up to Tarowatsivo, which is two above the rank of the present chief and one below the highest, typically called Moli. A Moli cannot enter this house; it is too "low" for him. He has his own special tabu-house close by, which no one else may enter, and there is one such in every village, though here it is purely formal as the only Moli lives a mile away. There are also houses which only women can enter, menstruation houses, and houses in which men and women may copulate but not sleep; all men sleep in the lodge. In the lodge no one who has not killed pigs can eat above the lowest division, which may also be entered by women. You may walk through any division, though it is not usually done to go above your rank. But you may never touch another fire, its firewood, or anything made, lit, or cooked by it. I was treated kindly but firmly; given a fowl and plenty of taro; put in the bottom partition. I was not allowed to let myself or my food touch the floor; was supplied with large stones to prevent this. Though I had no matches, I was not allowed to light my candle from a fire, but had to use fire sticks. New stones, collected with an hour's labour from the beach by the chief's wife, were supplied to me. When I had cooked with these and with the new (carefully interwoven) cooking leaves, all was thrown away. This was repeated for three days. On the other hand I was invited to sleep in the chief's partition on his special bed; but I could not touch food there, and had to drink a coconut outside in the rain. I had to bury my food scraps. I asked what they would do if I or anybody else broke these regulations; they very simply told me that the only thing they could do about it was kill.

In the old days this graded arrangement was fun, competitive, the essence of Melanesian social climbing, their chief characteristic of business interest developed to the full. Now, with but a handful of men, it is a tragic ghost of a tradition, anti-social. It is awful to see the great Moli at Basen in his great long house with thirteen partitions, and he the only man there.

I found this rather delicate system a little irritating. But the kind people of Pikomai insisted that I stay with them; they liked looking at me, though we had no language in common, and they informed me by gesture that they had sent to the mountain, a day's journey away, to get me a special treat, apparently a new kind of animal food. So I stayed and watched the chief making a fishing-net by stripping down lilaceous leaf blades with an ingenious string arrangement, jerked to strip the chlorophyll, leaving 10-inch white filaments; these are smoked for half a day wound on to thin twigs, one end secured on a wide shuttle needle; then with a polished bamboo held in the left hand to keep the loops tight he would weave too and fro in a simple criss-cross, easily and peacefully, in the dark unlit hut. I learned something about fish-nets and this very simple loom (only seen here) before my special treat arrived. The treat turned out to be a revolting albino baby, taken from a protesting mother and carried a day through the mountain rains, in order that the white man should see the only thing in the area in which he was expected to be interested. This was the only albino I saw in Santo, and I did not see any later in Malekula; on Gaua, with a population of only 650, there were six albinos. Natural "half-castes" are common in the Big Bay and Wora Point hill area, some very pale; like the people of Omba, this irregular paleness is not due to European influence.

South-central Espiritu Santo

After returning for a few days to Hog Harbour and finding Marshall fit, I went on another and more interesting trek across south Santo and then north to Santo Peak, to link up with Baker's visit to that area from the Big Bay side. I was travelling for a month and was accompanied throughout by one Sakau boy, Ragh, who is now by far the best-travelled native in Santo, for he also climbed Mount Tabwemasana with the expedition party in 1933 (*cf.* Baker, 1935, p. 209). From Hog Harbour we went to Shark Bay and then struck inland into the curious south Sakau and Ladhogh tribes noted by Baker in 1927 (p. 305); we then worked south well inland to unvisited country behind Mount Turi, 1100 feet, the highest point in coralline eastern Santo. In parts of this area there was a jungle I have not seen elsewhere, stinging trees dominant with slender trunks up to 30 feet high and close together, a ground growth of succulent stem plants. This unit occurred over a wide area north-west of Turi at about 500 feet, and its most obvious characteristic was the abundance of the banded rail (*Hypotaenidea p. swindellsi*), a bird exclusively of open places elsewhere. This forest was dripping with moisture and the rainfall in the area must have been exceptionally great. Flying-foxes and wild pigs swarmed, but there were no natives. It rained incessantly all the time, so that everything was a nasty mud slush, dangerous because of submerged sticks and stones and bones with possible tetanus infection.

For several days I wallowed in mud, chasing non-existent villages along

half-existent pig-trails. We had relied for food on the South Sakau people. We found them in a state of famine, partly due to the March hurricane and partly to the death of the big chief in Ladhogh, which had caused several villages to abandon their garden sites and shelter temporarily in distant parts of the bush in a typical panic about witchcraft, poison, and subsequent reprisals by powerful Ladhogh on its weaker neighbours, who number only eighty in five villages and are nearing extinction. These reprisals occurred, but against the North Sakaus, who were blamed for Seleru's death; several killings resulted. In non-taro areas famine is not at all unknown, and its incidence is assisted by the death rites in which a dead man's gardens, trees, and pigs are partly or wholly destroyed. This custom has the most effect at the worst times: *i.e.* during epidemics. In the old days of high population famine must have been an ever-present possibility, as it actually is now on densely populated islets such as Meralav, which depended at this same period (May 1934) for its food on rice and meats brought by planters, who in return demanded labourers for their plantations. And the white man has introduced and spread many vegetable foods which were unknown before. Cannibalism must have been almost a necessity in the old days.

East and south of Mount Turi is a cluster of villages, decreasing about 4 per cent. per annum. These people, called Kolendrola, are very thick-set and hairy, with customs, pig-rites, and lodges transitional from Sakau gradually towards the type on Malo island just south of Santo. They are mad on cats'-cradle string games, males of all ages devoting hours to this amusement, in which they use both hands and feet, sometimes several performers working together at one pattern. Each string game has its meaning, its legend, or song. There is also a sort of quoit game. Whereas other inland tribes get salt by long journeys to the sea or by trading with the coastal people, these folk make an excellent tinny salt by burning the root of a palm. They also specialize in a species of sedge, the top of which is good eating. They are to an unusual extent interested in food and food variety. Netting flying-foxes is an important item in their lives and extends away to the south-west among the Meri and Antayii tribes, who have no lodge and belong to the characteristic mountain group already noted on its northern limit at Wunapenini. These nets are the best objects now made in Santo, up to 30 yards long and 6 yards deep, with many fathoms of corded rope; they are slung between high poles in the tops of erythrina trees in a prepared glade, each with a well-hidden hut for the operator, who, working at evening, drops the nets with an ingenious pulley system when there are several flying-foxes in the right position. The net, correctly weighted, crashes to earth. May is the season, and many animals are caught in a night's work. But the several times that I went with a hunter we caught nothing; I was assured that this was due to "smell belong white man, flying foxus 'e 'ear 'im 'e sing out."

Travelling south-south-west from the Kolendrola district over hills up to 2060 feet, very broken up and down country, there was a small population, obviously dying out, with one small distinct group up in the mountains towards the north-west, the Betnalambewusi on the watershed between the Lambe-Yora river system flowing to Big Bay and the lesser streams going south-west to Tangoa. The last 20 miles was uninhabited, but with every

evidence of a big population in the past and great areas of secondary jungle. My feet were apparently poisoned when I reached Tangoa, but as I had arranged to meet Marshall at the north-west peninsula at the end of May, I had to press on; and so after a day's rest at the Presbyterian Mission headquarters, I went over to Tasmalun on the south-west mainland. There I found the last relic of a coastal population, with a man Vishiravi and a party from the mountains. I went inland with the party who had been working for whites on the south-east coast (which is much planted and civilized); they were returning with calico and knives which they were to barter for pigs among the inland people, who rarely or never came down to the sea. I wandered around with the traders in the Fialo–Nevaka river system up to the main watershed, counting and studying the large Harke and Antayii tribes scattered in communal-house units on magnificent mountain spurs around 3000 feet in this lovely district. My feet got much better directly we got to higher levels. Our procession was, in one way, a mournful one. For several days and nights we did not escape from the regularly repeated, eerie booing and booming of conch-shell trumpets re-echoing through the valleys. In nearly every village some person or persons was dying of influenza—the epidemic I had noticed beginning a month before 60 miles farther north. My party had to stop at each village, partake of the usual enormous yam and pig feast, and do a perfectly cold-blooded and extremely efficient cry into the door of the deceased's house, a performance in which I learnt to participate, thus adding considerably to my prestige. Progress was slow in consequence; my stamina was interfered with by the persistence with which the conch-blowers sat beside me during the night, because they knew that I was interested in native customs.

At Tsenan, 3000 feet, I had difficulty owing to a war with adjacent Obai at the foot of Santo Peak, centring around a poison case. In order to make it possible to work in this area I had to act as go-between and make a temporary peace. Village feuds are frequent as a result of sorcery suspicions. Several natives travelled long distances to see me with presents of fowls and taros to buy my opinion as to the innocence or guilt of certain men in causing deaths due to influenza. Owls, dogs, and cats are carriers of this sorcery by night, while there are awful rites of body-cutting with the insertion of poison woods, and leaves, which probably do actually occur in connection with a very secret society called Vinavini, paralleled by the Marimatsa on Malo and Nimbetni in south Malekula. In general, superstition reaches its maximum here. I was once completely deserted within a few seconds by my companions because a wild fowl suddenly called out close to the path.

These people make good mats and baskets, the latter black-and-white chequered. Men and women cooked and fed together at one fire, except for one section of males in the rank society who fed apart and drank *kava* by chewing and spitting into coconuts. Shell beads were very valuable so far from the sea.

At Obai, the highest village in Espiritu Santo on Mount Losobunu (see Baker, 1935, panorama 2), I was offered a number of European objects, including dark glasses and revolver bullets, property of a man just dead. Months later I found out that these were things stolen from Clapcott, the deaf trader who was murdered and eaten at Tasmalun ten years before. This

murder was the culmination of an extraordinary religion, based on faith-healing and anti-white, started by an ex-Presbyterian trained teacher, and involving the alleged return of a ship laden with food and all the blacks who had died since the coming of the whites. A great house and a great feast were prepared for this event. The faith spread secretly all over the bush, and only characteristically bad organization saved what might well have been a general massacre of the white men. Three of the murderers were caught and hanged; the last of the participants had died the day before my arrival at Obai. Several men in this area had a form of "lobster claw" with hands and feet twisted over, remarkably deformed or elongated. Population decrease is slower here, partly owing to the absence of malaria and tuberculosis, with consequent better health giving a good chance against epidemics. The constant magic and sorcery fear is however harmful as a frequent source of murder and war. One or two government patrols could rectify this, as the people are not at all warlike, nor violently anti-white.

From Obai I climbed Santo Peak, ascended for the first time by Baker a few months before. I also went over the western watershed towards Tasiriki on the west coast, but did not find the bottle left there by Speiser in his second unsuccessful attempt twenty-two years before; his first had been from the south, but hostile natives had caused him to spend ten days going round in circles, uselessly. With Ragh and one Obai boy I built a shelter under the summit from which to examine and enjoy the magnificent panorama over both sides of the watershed, commanding the greater part of the whole group. In particular I wished to look north-east for a route towards Sakau. Mist, rain, and cold (too severe for the natives) drove us down the second night to Sulemolimoli, in the head of the Yora valley, which takes its name from a single sacred monolith, the stone of the great chief. At several points on this mountain path there were little shrines of twigs and stones, not unlike some that I had seen previously in Borneo. They were used by an old man who lived alone under the mountain, and who regularly performed magical rites and rites to prevent sorcery from crossing the range to the south. The mountain pigeon, *Ducala bakeri*, was very common; on the other side of the watershed Speiser had long ago remarked "the natives pretend that a particular species of pigeon lives here."

The natives who had worked with Baker on his Yora expedition expected higher wages and more presents than I could consider; the people in this part are particularly acquisitive. After two days' delay I did somehow manage to induce two men to act as guides into the Lambe river, which runs in an arc eastwards and then north-west to join the Yora about 10 miles from the sea. Baker had been west of this area; Montégu and Renault had passed on its east border in 1911. It is an exceedingly broken hill country, bad going. I had expected to find a considerable population as in the other valleys; there were no more than sixty-seven people in six villages. All the lower river and all the country to the east right away to the Talitas river was without inhabitants, as is the lower Yora-Hapuna area, over 700 square miles in all. Several large tribes, one called Putfilegar, lived here in the past. The Lambe natives were very much upset by my appearance. They have the native reputation of being the greatest talkers and stupidest workers; these characters they effectively

demonstrated to me during the two days in which I tried to get on towards the sea. All over this hill area there is a general dominance of females, whereas on the coast there is always a male excess. The Lambe people trade their women for pigs over a wide area to the south. Twelve totemic clans divided into two matrilineal exogamous moities, taking their names from animals, plants, stone, and water, are parallel from valley to valley despite local variation in details. Even here in the heart of Santo almost every man wears turtle-shell ear-rings with pigs' tails attached; an armlet made from a tendril is popular here, but not elsewhere in the island, though I have seen it on Pentecost and on Vao.

Eventually a very reluctant guide took me over a bone-aching tangle of valleys and ranges to intersect the Yora river below the lowest village, Tumbutumbu. Here we found a leper living in a little hut by the river. He was delighted to see me, and in a rotting hand presented me with a very "high" boiled longicorn beetle-grub. Native etiquette triumphed over white hygiene, and I managed correctly to bite off the head, squeeze the grub's purple innards out of the tough skin into my mouth and swallow. With practice I grew to enjoy eating these big fleshy maggots; but even in memory I did not enjoy my first.

Our guides would take Ragh and me no farther. We had to make the cross-country trip to the Hapuna and down to the sea alone, finding a way with difficulty. Food, birds, and plants were unexpectedly scarce. We ate only several unripe bread-fruit each, plus a small eel caught in some shallows.

Mount Watiamasan

After three weeks' trekking I reached Tavunamalo on the west side of Big Bay late in May, to find Marshall had arrived by launch a few hours ahead of me. Next day we started on a joint ornithological trip to check up my bird results from Mount Tabwemasana, 10 miles to the south, made in the previous year. I had previously noted as suitable Mount Watiamasan (4600 feet), north of Wunapenini, which I had passed through on my north-west peninsula trip (see above). We went up the beautiful Malawus river and gorges to sleep at Wunapenini. Here we filled our rucksacks with as many taros as we could carry, because we expected (correctly, as it turned out) continuous rain and damp on the mountain; we wished to give all our time to bird work and none to domesticity. Three natives came with us from the village, north, and then practically straight up Watiamasan, following an old path. We had determined to camp at not less than 3800 feet, the height of my main observation camp on Tabwemasana. We had the greatest difficulty in getting a native to come above 2500, the height of their highest villages; typically they insisted every few paces that this, at last, was the top and that my aneroid was no good on their mountain. Late in the afternoon we had cajoled them to 4000 feet: travel in these islands requires above all things patience and a gift of the gab. All of us quickly rigged up, on the only approximately level place, a lean-to of sticks covered with large leaves, sides blocked in with tree-fern. The natives left for home at full speed, and we were left in possession of a mountain range and a cloud sea.

Our shelter, 7 by 5 feet, was nearly all filled with a platform of sticks,

variously twisted in accordance with the wind-swept vegetation. This was our table, chair, and bed; each night regularly one of us rolled and fought his way into a comparative groove at the cost of the other's rest, the ground on which we lived meanwhile gradually sagging and showing a marked tendency to go away downhill. At levels above the shack was a thick pandanus jungle, growing criss-cross from 2 to 3 feet off the ground, so that one either crawled or more conveniently adopted semi-arboreal methods of progression. As I was rather sick of walking about, Marshall did the shooting of specimens (owing to the steep slopes a difficult job) while I stayed in camp dissecting, skinning, and making observations. On the rare occasions when the cloud rose we had a glorious view over Big Bay. We were even able to follow the slow course of the inter-island steamer *Makambo*, since wrecked, all the way up the east coast and into Big Bay on its tri-monthly visit to Robertson. By that time the saturated atmosphere had grown a 6-inch mould on the remaining taros, and we had more than satisfied ourselves that my Tabwemasana work had been thorough, and that the present results agreed with the earlier. So, rather reluctantly, we left our eyrie and dashed down to the sea in search of letters and tobacco. When we got back to Hog Harbour, at the beginning of June, I had a little dysentery, but soon recovered, and for the next month I stayed mostly at Hog Harbour so that Marshall could rest. This time I devoted partly to further studies of the remarkable Sakau tribe in that area.

Trouble in Sakau

I found among other things that the Sakaus were not, as had previously been supposed, always an inland people only, but that they had once a big sea population, the last village of which died out about 1905. They even had a very simple canoe and trade system. Though their culture is undoubtedly the simplest in the New Hebrides, and their dual organization very crude, they have lost several rites which are important. Curiously, there has been no cannibalism since 1906; this is unexpectedly due to firearms. The Sakaus say that a man shot with a gun is possessed of dangerous devils, which would be fatal to any one who ate him. In 1884 Rannie (1912, p. 107) described their dress; he adds to what has been said by Baker (1929, p. 305) by remarking the use of shell money hung on cords as an apron in front and attached to the curious wooden buttock block worn behind; Deacon's (1929) account of this block being worn by women is wrong. Rannie (1912) also describes the people at that time as "a splendid lot of savages—all tall strapping fellows . . . inclined to be saucy." They had a hundred new Sniders and they attacked his ship. They alone of New Hebrideans specialize in cultivating sweet potato and paw-paw, the latter considered food for pigs in west Santo; both plants are supposed to have been introduced into far eastern Polynesia by American-Indian contacts. The Sakaus differ in language, physique, and in having a simple form of the complex Hebridean culture. Their mythology suggests that they were perhaps late settlers, of North Melanesian origin.

Marshall and I got mixed up in a local war by characteristically Melanesian illogic. Briefly: a man Ser had many years before been accused of poisoning a man at Heren, one of the western villages; to escape death he had fled to Lelek, on the east side of the peninsula. Heren had been after Ser for years.

One night a party of twenty-five travelled all night, got into Lelek unobserved, surrounded the door of his house, and as he came out at first daylight blew him up. They then bolted for home. I happened to be up at Lelek at the time and sleeping in an adjacent house. I learned that day the important lesson: never go out of a house first in the morning; go out last. Lelek, recovering from their first abject fear—they made me walk ahead along the main path—went off in a party of eight towards Heren, 30 miles away. On the way they met a single man coming towards them along the track. They all, including a boy of seven, opened fire, killed him, and fled home satisfied. The dead had been avenged, the spirit enabled to come down from its high tree unusually quickly and easily. But the dead man belonged to another village which had nothing to do with it at all, powerful Yekul with ninety-two inhabitants, and he was coming to see our cook-general, Sedhi, about a pig debt (as usual). Therefore Sedhi was held by the enemy to be morally responsible for the death, which should therefore be avenged on him. I spent a hectic week dashing around raising a pig to buy them off, and thus raising further suspicion on myself as a collaborator. After some tricky manoeuvres, and at the cost of a valuable pig, the western villages were induced to overlook us unfortunates in the middle and get at the west. Within a few weeks all the paths were blocked, several villages abandoned or shifted, even the mission boys at Hog Harbour afraid to go to their gardens. At this stage a British warship, H.M.S. *Diomede*, came in. I conducted several officers inland to take films, with Sedhi as our guide. Sedhi disappeared at one of the villages and did not come home for two days, when he blandly reported that a further shooting had occurred during his stay and that he would again be involved in reprisals. He was. We had the same fun all over again. The trouble spread as far as the Ladhogh inland to the south (*cf.* above), which, though a strong village, was forced out to the west. Thus when I left Hog Harbour, in July 1934, a complete reshuffle of the village grouping had taken place, and the expedition map of a few months before was right out of date. Yet only three people had been hit. And Lelek is under 2 miles from the government station for the northern isles, which has had a white officer and a police unit for twenty years. These wars are not statistically serious, for the Sakaus have 157 adult males to every 100 females. The most important property of each man is his gun. These are old Tower and Snider hammer guns of the middle of the last century. They are kept beautifully clean, rubbed daily with coconut juice and husk, so that they always shine, always look like silver. A man does not move more than 5 yards without his gun, for he can never know at what sudden moment he will be pointlessly ambushed.

Malo

Several times when waiting for ships or canoes in the Segond Channel area of South Santo I filled in idle days with visits, up to a week in length, to nearby Malo. I found about four hundred and fifty natives on this coralline island, in six tribes with two distinctive languages; decreasing, and about half-heathen. They live mostly to the north-east and around Malo Peak at 300 to 500 feet; a large area in the west is now uninhabited. Villages are small, with beautifully cultivated croton and hybiscus; the people, tall and dark, sometimes approxi-

Sakau men in a yam garden

Hill people of central Santo

A hill village in Santo

Sakau boys and tusker pigs

Sakaus roasting a pig after dance and sacrifice

mating to the Sakau type. Extensive stoneworks, especially pig-killing tables and mounds, testify to once great population. The pig-killing rites and ranked society are more elaborate than anywhere else, centring on the intersexual pig, which originates in Sakau. The men's lodges are open at the ends, floor partitioned. Malo is an important diffusion centre for this cult.

A dreadful secret society, the Marimatsa, survives, though initiation involves among other things the murder of a blood relative. Cannibalism has special features, and its rites have been performed as lately as 1930. Polyandry is recognized. Gonorrhoea is prevalent, as is often the case in non-kava areas in contact with white men. Syphilis is very rare in Melanesia, where framboesia (yaws), which always occurs in childhood, seems to prevent subsequent venereal infection: on Malo it appears to have occurred in epidemic form about 1913, but not since, as is attested by several whites living there. Early in this century planters made an intensive land grab for the fertile soil and good anchorages of east Malo. Natives were driven out by doped liquor or at the end of a gun. The position there is still very unsatisfactory. On Aore the native population has been completely exterminated.

Just before I left the Group I met Punu and Kerai of Betap, my faithful companions in all my bird work on Mount Tabwemasana; they were working for a planter on Malo to see if it was a good thing to do and then to report on results to their hill companions. I am afraid that we gave the people confidence in the whites, which will now be abused to the detriment of all concerned. The Bakers and Bird had left some biscuits and tinned meat on their way down to Big Bay from the mountain, so that I should have something to look forward to when I followed. But when I came down later I followed a new route, farther north. Punu told me that the provisions were still there, awaiting my return. I told him that I would never return, much to my regret; they must eat it all up. Punu said "No, it shall wait. One day one of you will return. And if any other white man ever comes we shall hide it, so that we may keep it for you." How typically Tabwemasanan—beastly acquaintances, good friends. I expect Punu is right; that one day one of us will return.

Ascent of Omba

I went to Omba on a short visit because it is the most civilized, most Polynesian-like island in the New Hebrides. The men are often pale-skinned and wavy-haired. In the north-east the women are completely tattooed, as in Fiji. I found the Ombans to be superior in look, intelligence, and energy to the western islanders (Santo and Malekula). The population, particularly around Dundui in the south-west, strong, comparatively healthy and apparently increasing, despite constant stealing of women by French recruiters. Women have a much higher status here and are the best looking in the Group. Cannibalism, now extinct, included women and was voracious, deliberate, sometimes cruel, unlike other islands. A bisexual cookhouse largely replaces the lodge in domestic and social importance.

There are no white plantations on the island, the natives having early woken up to the evil effects of selling land to planters. Several natives have large plantations of coconuts, cocoa, or cotton, which they run entirely themselves. I called on Vera Maita at two in the morning; he greeted me gladly, in

silk pyjamas; in a few minutes he had made me China tea and buttered toast on his Primus and toaster. With other Ombans I was making a flying visit to discuss with him plans regarding the improvement of the island and the people from their point of view. They were most anxious to give me several hundred pounds to go back to England on their behalf, so that I might arrange for two or three Ombans to be properly educated and fully versed in the white man's ways. There would then be some one to direct the people. Heathens still practising their old rites were in favour of the scheme as well as the Christians. Their pride in themselves, coupled with a desire to evolve along white lines and with the ability to keep up with the whites, even surpass the whites, transcends, as nowhere else in the Group, sectarian barriers. I was also to let everybody in England know that Omba was civilized; not peopled by black ugly savages like the rest of the New Hebrides. And I was to make the Government of England enforce the laws of recruiting women and the sale of alcohol. I think some such scheme is practicable. I wish that my work and qualifications had permitted me to accept their offer, and I take this opportunity of stating emphatically my opinion that this island will become a potent force in the development in the Pacific, and a good one. These are the only people who have proved themselves capable of running a church of their own—the Church of Christ at Dundui. They study market values, experiment with cocoa and coffee. The Hebridean comes out, though, in their planting: too many trees too close together, to get more per acre!

My friend Lindsay Macmillan had described to me an ascent, probably the first, he had made of Lombenben, the 4500-foot mountain that covers most of the island, rising steeply from the sea to an extensive but uninhabited plateau on top, with four or more large extinct volcanic craters. With four natives and a large quantity of bread I left Dundui early one morning in August 1934. After the last village, about 1000 feet, we passed through high jungle on to a narrow, rocky stream-bed. There were many sheer rock places, round which we had to crawl and cut; the jungle was dense and soggy in the typical mountain way, though the stream itself was almost dry. Other gradually sloping places were smooth and slippery. My companions got very discouraged in the rain-drizzle and the particularly depressing forest around us. Any other than Ombans would have turned back when one man slipped about 20 feet and opened his leg muscles with his bush knife. As it was, we left a red trail. Just at dusk we came through the last defile on to the plateau. Everything was so wet and uneven that we had to camp on a little bank on the stream-bed. We had expected to find wild banana leaves, which I had elsewhere used for roofing in the mountains. There were none, which committed us to four nights of being dripped on through layer after layer of tree branches and fern leaf on the roof. Luckily it never rained hard enough to flood our piece of bank, though it was damp enough to make the best way to sleep squatting on a stone with your back against a tree trunk. We had expected, too, to find the mountain pigeon and several other edible birds; the avifauna turned out to be much more limited than that on Santo mountains and the special Santo mountain species are absent, though sub-montane small birds like *Petroica* and *Charmo synopsis* were numerous. We ate these. It took us a day and a half cutting and meandering round the gulleys and cliffs

to find the nearest crater, which is nearly a mile in diameter, a level marsh with the earth noticeably warm, steep sides 200 feet high. Three natives spent their time collecting birds, which I skinned in the late afternoons.

After four days we had a fair bird sample, with some probably new subspecific forms. The natives, who had stuck to it better than I had seen any other New Hebridean do, had reached a saturation point of dislike for their Mount Lombenben, mythical home of Tagaro, benign creator of all these islands, who had displayed but little of his benignity—perhaps because we were all alleged Christians. We slid happily down to Dundui and gorged ourselves on taro pudding for several days after. A thorough biological and topographical exploration of Omba would be interesting and easy. Undoubtedly no route of ascent could be worse than the one we followed. I understand that the natives have a known track from Lolowai to the craters at the northern end. De la Rue (1935) has observed that Omba is composed of recent volcanic series to be distinguished from the much older pre-Miocene series, which form the large mountains of Santo and Malekula; the absence of the four species or genera typical of Santo mountains confirms and is explained by this view. The dominant plants are tree fern and flame tree, as on Santo.

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NEW FALL ON THE SEMANG RIVER IN BRITISH GUIANA

IT will be remembered that there have been two papers recently published in the *Journal* dealing with the waterfalls of British Guiana. In the *Journal* for March 1935 there was a note on the newly discovered falls of the Ipobe river, which with the permission of H.R.H. the Duchess of Kent were named the Marina Fall: and in the *Journal* for December 1935 there appeared an article by Dr. G. J. Williams on the "Aerial Reconnaissance along the Kaieteurian Escarpment in British Guiana." This was communicated by Mr. D. R. Grantham of the Geological Survey, and was accompanied by some excellent aerial photographs. By the courtesy of the Secretary of State for the Colonies a third report has now been communicated to the Society, and is printed below. It was drawn up by Mr. H. Bracewell, Economic Geologist to the Geological Survey Office of Georgetown, and concerns the discovery of certain new falls on the Semang river of British Guiana, the largest of which it was proposed to name "King Edward VIII Fall." To this proposal His Majesty has now graciously consented.

"During the recent geological survey of the Semang River a number of magnificent waterfalls were located where the Semang and its tributaries, the Sabrek, Kulishiri, Purupuruni, and Achipomu, leave the sandstone plateaux. Some of these had been previously observed during the 1927 Geological Survey of the Semang and more recently from the air by Mr. A. Williams during his flights to Kaieteur *via* the Semang River. So far as I know, no one has ever before visited the falls, and as there is no indigenous population in the area the falls have no special name. They must now be named as they can be placed on the map, and I feel that the appropriate naming of them would stimulate interest in, and add to the enjoyment of, the flights over the interior which Mr. Williams and others are trying to develop.

"The greatest fall observed is the one located about 30 miles up the Semang River. Aneroid readings taken at its brink where it is about 50 feet wide, and in the gorge below, indicate that the total drop is approximately 840 feet. This is not a single vertical drop like Kaieteur, as there is a slight break about one-third the distance from the base. Three photographs are submitted herewith, one taken by my assistant, Mr. P. A. Forte, in the gorge below the fall and the others I took from the brink of a neighbouring fall of similar height in the tributary of the Semang about a quarter of a mile distant; these illustrate the impressive beauty and magnificence of the fall and, I hope, justify my own personal desire that this fall be named 'King Edward VIII Fall.'"

King Edward VIII Fall, from the gorge

King Edward VIII Fall from the brink of a neighbouring fall

Another view of the fall

ALPINE GEOLOGY

FLUSS UND EISWERK IN DER ALPEN ZWISCHEN ÖTZTAL UND St. Gotthard. By JOHANN SÖLCH. Ergänzungsheft No. 219–220 zu *Petermanns Mitteilungen*, 1935. 2 vols. 11 × 8½ *inches;* 327 *pages*

THIS important work deals with the part played by rivers and ice respectively in the development of the present surface features of the Alps. It describes the author's extended studies in the field and gives the results at which he has arrived from these and from a wide reading in the previous literature of the subject. The work consists of two portions: the first relates to the author's personal observations in the district between the Ötztal and the St. Gotthard, namely (1) the Inn district, including the Ötztal, the Tyrolese upper Inn valley, and the Engadine; (2) the Rhine district; (3) the district of the Italian lakes and the Adda; and (4) that portion of the St. Gotthard drained by the Ticino. The second part consists of a discussion of the special surface features which are characteristic of glaciated mountain areas in the Alps and their origin.

The work is illustrated by 52 reproductions from photographs (the greater number taken by the author in explanation of the text) and a similar number of text figures; a table containing 160 references to the works of previous authors is given at the end and references to authors quoted are also provided at the conclusion of each section in Part I.

The absence of a general index is regrettable, but tables of contents are given at the beginning of each volume. No maps are provided, and their absence makes it difficult, sometimes, to follow the detailed descriptions; but it would no doubt have been impossible to provide maps of so extended an area on a scale sufficiently large to show the necessary details and the reader is given a list of the most useful maps to consult.

The broad conclusions of Part I are: The oldest valley-system recognized belongs to the upper Miocene or Mio-Pliocene, but its remains are confined to the Ötztal and the neighbouring Inn valley, where it lies at a height of 2000 metres or more. Others, neither so well preserved nor so easily determined, occur in the Italian Lake region at 900–1100 metres. This considerable difference in height between the north and south sides bears witness to the distortion which the older upper surfaces have experienced and the dissimilar amount of uplift which has taken place from the north and south foot of the mountains respectively. This is more noticeable in the Pliocene group of valleys. The evidence not only shows the difference in height on the north and south slopes of the Alps, but also indicates a rise from east to west as far as about the meridian of the Bernina. There follows also independently of the surface building an incurving and continued rising farther to the west. The lower Pliocene surfaces for instance stand at about 1900 metres in the Ötztal, at 2500 metres in the Upper Engadine, and at 2100 metres in the Splügen furrow. The Upper Pliocene valley floors are considered by the author to occur in the middle Ötztal at 1400 metres, in the district of Reschenscheideck at 1600 metres, in the Upper Engadine at 1900 metres, and in the Albula at 1750–1800 metres. The most noticeable point however is the course of the pre-glacial valley floor. In the Upper Engadine this is preserved, in the main, at its original height of 1700–1800 metres, whence it sinks with a moderate fall to the Inn valley. It is found at 1100 metres at the mouth of the Ötztal, in the Albula, above Flims, at 1450–1550 metres, and in the Hinter Rhine at 1300–1400 metres.

Everything is different on the south side of the Alps; here the Lower Pliocene surfaces, at the edge of the mountains, lie at about 600–700 metres in the west

and 800–900 metres in the east, and at about 600 metres in the Italian Lake region.

The downsinking of the Insubrische zone is thus clearly evident, but the axis of the sinking runs obliquely through the mountains. For a time it runs parallel to the Insubrische line; north of this the lower Pliocene surface rises rapidly to 2000 metres. And similar conditions are repeated in the case of the Middle Pliocene Terrace systems. The same conditions must therefore have lasted for some time after the inception of the movement. The principal differences between the north and south slopes of the Alps consist in the fact that in the south the slope is much more bent in at the edges and that its foot is much lower. This difference was already noticeable in the Middle Pliocene: even then, the sea surface forming the base line of erosion lay a long way from the foot of the mountains. The pre-glacial valley floors of the Ticino and Adda districts lay much deeper than those of the Rhine and Inn. Both sides suffered glaciation; and isostatic movements of the Alpine mass were connected with the coming and going of the Ice Age.

In Section I, Part II, the author elaborates his theory of the "*Aufwärtswandern der Gefällssteilen*" which he puts forward as, in his opinion, of first importance in the development of valley steps and benches. He postulates a series of uplifts (in ? pre-glacial times) as the result either of faulting or folding at the foot of the mountains or inside the mountain mass itself, and traces their effects in forming a series of valley floors, one within the other terminating upwards in notches. He traces the backward migration of these sections of the valley floor and remarks that without long periods of rest between the uplifts these cannot catch each other up. This "theory" is in fact an exposition of the well-known laws of Rejuvenation of a River System by uplift. He considers in detail the effects of hard and soft rocks, their bedding and strike, the volume of water and changes of climate, etc., and considers hard bands of rock as the most effective factor in originating steps, each of which will form the base of the erosion curves of the different sections of the valley. He discusses the way in which debris deposits may delay the rate of backward erosion and regards the present-day steps as former *Gefällssteilen* which while retreating up the valley have been overtaken by an ice-age, but he does not consider that every valley step corresponds to a definite upheaval.

The effect of subsequent glaciation in modifying the steps is discussed in the section on *Talstufen* which follows, in which the different forms, including Hanging Valleys, are discussed, and he expressed the view that ice was relatively a protective agent, and that although it did modify the steps it was not the principal agent in their formation though the work of frost may occasionally have accentuated them.

The remaining sections deal with the problems of the formation of the *Tröge* (trough-shaped valleys), *Riegel* and *Inselberge*, *Firn* and *Schutthohen*, together with notes on corrie formation. Much further investigation in the field is still required, especially as regards the part played by screes and other superficial accumulations as protective agents: also the effects of *Epigenese* in the history of the valleys of the Alps in which expression the author includes his theory of the *Aufwärtswandern der Gefällssteilen*.

To sum up. The study of the valley development in the district between the Ötztal and the St. Gotthard examined by the author points to the following conclusions: (*a*) that the chief work in the modelling of the Alps has been done by water. Ice, on the whole, has acted as a protective agent to the mountains and valleys; (*b*) that the effects of glaciation were chiefly confined to weathering above the ice, especially in the neighbourhood of the ice-margin; (*c*) that as

regards the steps, many are not simple but consist of a collection of associated forms and have a correspondingly complicated history. Their development in detail was caused or at least assisted by ice, debris, and *epigenese*. The alternations between inter-glacial and glacial periods is reflected in the complexity of the steps. In the case of corries, with the floor covered with ice, the wall is weathered back.

Typical *tröge*, *i.e.* those excavated in rock with a U-shaped cross section, are confined to the bottom portion of valleys and are chiefly due to disintegration at the edges of the ice but also in part to the weathering of the walls above the ice, especially in rocks which favour the formation of steep walls. The side valleys which remained behind when the main valley was deepened are connected, the author considers, not so much with the overdeepening of the main valleys as with the inability of the side valleys to keep pace with the erosion in the main valleys. This inability is due to several causes which are connected together—climatic, petrographic, and morphologic (surface deposits).

The pre-glacial relief of the Alps did not exhibit the same features of landscape development right into the inner corners, but the valley floors and cliffs were developed over each other and in each other and true steps were developed chiefly in the upper portions.

There has never been a continuous névé covering the district. It is difficult to trace the old valley systems from the distribution of the flat surfaces, at the same time the regular recurrence of less inclined surfaces at definite heights points really to a succession of upheavals occasionally causing a valley system to be developed.

In conclusion the author sums up in favour of his theory of the *Aufswärtswandern der Gefällssteilen* which he considers in a great measure explains the riddle of the origin of the present valley landscape of the Alps and accounts also for all the events which followed.

The author himself however considers that further tests must be applied to establish the validity of his theory. It is to be hoped that these will give more precise evidence of the effects of the successive glacial and interglacial periods in the development of the present surface features and more especially of the steps.

E. J. G.

REVIEWS

EUROPE

WANDERINGS IN YUGOSLAVIA. By NORA ALEXANDER. *London: Skeffington & Son*, 1936. $9\frac{1}{2} \times 6$ *inches; 288 pages; illustrations and map.* 18*s*

Mrs. Alexander has added another to the growing list of books about Yugoslavia which will help to turn the attention of English holiday makers to a land rich in attractions. Some parts of it are already fairly well known: but few have yet penetrated to the fascinating country that lies behind the coastal ranges, Bosnia and Herzegovina, Montenegro, and the mountains and plains of old Serbia and Macedonia. Yet here is everything that the tourist in search of unspoilt country will delight in: rugged mountains and forests, deep river valleys and fertile if scanty plains, picturesque towns, and a people who still wear their bright and varied costumes, and give a friendly welcome to visitors, especially if they be English. If the facilities of road and railway and hotel are still a little backward, they are improving year by year, and are not expensive: the only formidable obstacle is the language, for German is of little service south of Sarajevo, and Serbian is a Slav tongue, not easily mastered.

Mrs. Alexander's commanding interest is in the people and their life. She first came into close touch with them by spending some months in a bungalow at Kamenica on the Danube. Then with a companion of kindred spirit she set off on a tramping tour in which they visited the chief beauty spots of Bosnia, touched Dubrovnik and explored the Gulf of Kotor, climbed the pass to Cetinje, and puffed in the tiny steamer down the lake of Skutari, and came back to rest on the sun-drenched island of Vis before returning to civilized life at Venice.

All this can be done in comfort; but these hardy ladies preferred to rough it to the full: primitive lodgings had no terrors for them, but they would sleep in the open or camp in a deserted palace garden, travel third class on the Adriatic steamer and fourth class on the narrow-gauge train. They welcomed every adventure that came their way, from gate-crashing a monastery to fishing for sardines by night in the Gulf of Kotor. The peasantry thought them quite mad, but opened to them none the less that warm hospitality to strangers which is the odd counterpart of the primitive ferocity that avenges honour with bloodshed. They shared the *slavas* and wedding feasts of the villagers, heard their legends and songs, and watched the rural ways that the passage of a thousand years has hardly changed. All these are described in colours as vivid as those of the native embroideries.

After a brief respite of town life in Belgrade the indomitable authoress found another companion ready to adventure with her into Macedonia. They visited historic monasteries and churches, and the fatal field of Kossovo; they reached war-shattered Bitolj and the calm lake of Okhrid; they even survived the unspeakable railway back from Okhrid to Skoplje. The thrills and hardships of the journey need deter no one from following, for there is now a comfortable daily 'bus from Gradsko to Bitolj, untroubled by fear of brigands; and another back from Okhrid to Skoplje along one of the finest mountain gorges in the Balkans, though the beauties of the country would well repay any discomforts met with on the way.

Mrs. Alexander writes with an infectious enthusiasm. Here and there she makes a slip—the famous sculptor is Mestrović; the mountain above Banya Ilidja is Bielasnica; and Skoplje is neither spelt Skopjle nor pronounced Skopyle. Her book deserves a better map, for that which it possesses omits many roads

and railways which exist, and shows several which do not, including that between Banya Luka and Jajce (Yaytse in the map) which let the trampers in for two drenching drives. But these are minor blemishes, and the book should encourage many to follow her trail without undergoing her needless hardships. It is adorned with a number of excellent illustrations, some from the camera which nearly landed its possessor in prison. H. P. T.

HIGHWAYS AND BYWAYS IN SUSSEX. By E. V. LUCAS. Second Edition. *London: Macmillan & Co.*, 1935. 8×5 *inches;* xx+470 *pages; illustrations and map* (by FREDERICK L. GRIGGS). *7s 6d*

Since 1904 Mr. Lucas's book on Sussex has been a household possession in the county. We have never carried it (it is a little too bulky) on our expeditions, but read it both before and after—many a time after, to recapture the glamour of the way and add richly to the content of our experiences. It has now been much enlarged, and many of its revised pages record the changes of thirty years. It is unnecessary to recall the charms of the book, its graceful descriptions and introductions to all phases of life in rural Sussex. Happily in spite of the motor car and the feeling that "the Wen" will ultimately spoil all, there are still vast tracts in which the old traditions still obtain. The author's method as he goes about is to lay under contribution every person, book, pamphlet, and thing that may provide for his reader's fun, information, and pleasure. While exploring, he himself enjoys with an omnivorous gusto; and the result is such that, warp and woof, his Sussex is of so stout a texture that revised editions may be expected for several generations to come.

If there is a weakness it is on the archaeological side. Why did he not take some friendly antiquarian into counsel, and so avoid repeating erroneous material from old reports, now "a creed outworn," and handing it on for yet another half-century? Here are a few points for the next revision. Stane Street (p.44) does not go by the inn (Down's Hotel) on Epsom Race Course, but straight through the Grove at the Durdans. Tolhurst is Todhurst Farm. "Belinus, Stane Street's engineer" is a myth to raise a smile; and "the hostel on Bignor Hill" may sadly disappoint some thirsty hiker. Drayton (p. 141) did not address his muse to Poly Olbion. Nothing is known of the military occupation (p. 225) by the Romans of Wolstonbury, an earthwork thrown up in the third or fourth century B.C., if not earlier. In spite of Sir Wm. Burrell and its name, Saxonbury Hill was not a military station of the Saxons, but an Early Iron Age camp used by iron miners and having resemblances to Wolstonbury. One would be glad to see an end of the Pudens story in connection with Chichester and neighbourhood. It remains to say that the illustrations by Mr. Griggs are very good.

S. E. W.

ASIA

LANDESKUNDE VON TUWA: das Gebiet des Jenissei-Oberlaufes. By WERNER LEIMBACH. (*Petermanns Mitt.*, Ergänzungsheft Nr. 222.) *Gotha: Justus Perthes* 1936. 11×7½ *inches;* 124 *pages; illustrations and maps. M.*18

This very important contribution to our knowledge of a little-known and remote region is all the more acceptable, for it relates to a part of Asia which is likely in the near future to be brought into the limelight of international politics. All Mongolia is in the melting-pot, and even this secluded mountain-locked basin at the sources of the Yenisei cannot escape attention. Dr. Leimbach has collected and collated all available information from Russian and other sources. His bibliography has 239 entries of works which apply directly or indirectly to

this region, and as 90 per cent. are in Russian and only a few are in English, it will attest to the value of his labours that the essence of all this knowledge is now available to the majority of readers.

After describing the character of the country, which was a part of the erstwhile Chinese Empire, and is now anyway within the sphere of Soviet influence, he records its geological structure, climate, hydrography, its fauna and flora. But the real interest of his survey centres round the indigenous inhabitants—the Tuva, that curious backwater of humanity, a remnant of a very ancient stock which once inhabited the rich Yenisei valley, but who have long since been driven out—northwards to the Arctic wilderness, or southwards to the seclusion of the Upper Yenisei basin. Of these most interesting people, the Soiots of early Russian literature, the Uriankhai or Forest-dwellers of the Chinese, Dr. Leimbach gives a complete and detailed account. Physical and intellectual characteristics are noted, industries, such as keepers of reindeer, hunting of fur-bearing animals, breeders of sheep, yaks, horses, and even deer and dogs are carefully recorded, as well as their attempts at agriculture and commerce. Perhaps the most interesting chapters are those on the innate Shamanistic tendencies of the Tuva, in spite of Buddhist influence. The historical sketch extends from the Scythian era to the present time, and there are suggestions as to economic and national development in the future. From this we learn that the Tuva are strongly influenced by their Russian neighbours, and there is a photograph of a native contingent in Red Army uniforms.

The recent history of this far-off region has indeed been kaleidoscopic. Russian infiltration was strong at the time of the reviewer's visit in 1910–11, but by 1912 the Chinese had been ousted, and the region proclaimed a Russian protectorate, and Siberian settlers poured into this desirable land.

With the Revolution in 1917 China made another attempt to get back its lost frontiers and succeeded. But inordinate taxation had the inevitable result; chaos ensued and fighting broke out between Tuva, Mongols and Chinese, as well as the Red and White Russian elements. In 1921 the region was recognized by the U.S.S.R. as an independent State, and in 1923 "The People's State of Tanna-Tuva" was inaugurated. Since then there seems to have been friction between Tuva and Russia, for the latter still retain their troops within their "independent sovereign state."

There are seventeen illustrations, and two maps, geological and orohydrographical, covering the whole region on the 40-verst scale. D. C.

A PALADIN OF ARABIA: the Biography of Brevet Lieut.-Colonel G. E. Leachman. By Major N. N. E. Bray. *London: John Heritage*, 1936. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xvi + 430 *pages; illustrations and maps.* 12*s* 6*d*

It was the war that made Leachman a "hero of romance," as Sir Samuel Hoare puts it in the Foreword to this book. And yet Leachman's life prior to the war contained more of romance than would have satisfied any ordinary man. When he landed in Basra early in 1915 he was not yet thirty-five years of age, but he had had fifteen years of action and experience in South Africa, in India, and in Arabia, which had well qualified him for the tasks he was to perform.

Sir Samuel Hoare remarks that "if the war in the West produced few outstanding personalities, the war in the East was the background of three heroes of romance." It is probably true that environment shapes heroes of romances, as it does other things, to a great extent. The chapters of this book dealing with Leachman's life in the South African War are interesting, and it is easy to see how suitable a background the South African veldt was to Leachman's future career in Arabia. One cannot somehow picture him for instance, immobilized

in the mud and trenches of Flanders, in surroundings devoid of the picturesque, and having to bear patiently with enforced inaction. Service in India gave him the opportunity of trying his legs as a traveller in preliminary canters into Tibet and through Kashmir. These were the prelude to his Arabian career.

In introducing this there is a good deal of mysterious reference made to his high purpose, but it is never made very clear what it was. Nor do we learn, and it would have been very interesting to know, what it was that first directed Leachman's interests to Arabia.[1]

His principal claims to fame as a traveller rest on his pre-war journeys into this country, which were recorded in papers contributed to this *Journal*.[2] They show clearly, as do other scraps from his hand, that with Leachman the sword was very much mightier than the pen. One of his greatest dislikes was the putting of pen to paper, and in these circumstances it is remarkable that Major Bray has been able to collect all the material presented in this book.

With Leachman's experience of Eastern Arabia and Iraq, and his knowledge of the language, it is not surprising that he was chosen for political duty with the Mesopotamian Expeditionary Force; it would indeed have been very surprising if he had not been so chosen, and it is a little difficult to follow the author in his contention that his capabilities were wasted or his life sacrificed. He was appointed A.P.O. with the 6th Division and G.H.Q. on 12 March 1915, and it is evident that his previous experience in the country and exceptional qualifications proved of immediate value, for Sir Arnold Wilson tells us that he rendered signal services during the battle of Shu'aiba, and by maintaining the closest touch with his Arab friends obtained the latest information regarding enemy activities. Remaining as Political Officer with the force advancing on the Tigris front, he continued to carry on these duties up to Ctesiphon and then accompanied Townshend on his retreat to Kut. It was perhaps unfortunate that, by sending Leachman out of the place with the Cavalry Brigade on December 6, General Townshend was left with no Political Officer of experience to help him to deal with troublesome elements among the Arab population. He got away with the cavalry without incident and was not destined to enter Kut again during the siege, though it is plain from his letters that he anticipated that he might do so. However in March 1916 he was associated with the dramatic and much-criticized effort to relieve the garrison there. In describing this episode Major Bray, perhaps in search of effect, is not strictly accurate in stating that the Dujaila Redoubt was empty when Leachman reached it (p. 284), for Sir Arnold Wilson informs us that he "actually entered the Redoubt with a few mounted Arabs . . . and reported in person to General Kemball . . . that the garrison numbered in all some forty men." There are other instances in the book of an unfortunate tendency to strive after effect.

Major Bray regrets that Leachman was not more closely associated with the capture of Baghdad, but Sir Arnold Wilson pays a great tribute to his work on the western flank of the advancing army after the capture of the capital: he "did excellent work on lines peculiarly his own. He had no illusions about Arabs . . . but he bore no malice; he carried weight with the Divisional and Brigade Staffs, was popular with all ranks, and was respected, as well as feared, by the Sheikhs. His forceful character, his extreme mobility and robust common sense commended themselves to every one, except, on occasions, his harassed superiors. During the early days of our occupation he was indispensable. His

[1] Dr. Hogarth's obituary of him (*Geogr.J.*, 56, 325), gives some account of his approach to the subject.

[2] "A Journey in N.E. Arabia" (*Geogr.J.*, 37, 265) and "A Journey through Central Arabia" (*Geogr.J.*, 43, 500). He was awarded the Gill Memorial for 1911.

doings were the subject of endless tales, and his name was almost as familiar in Mesopotamia as that of Sir Percy Cox."

Sir Arnold Wilson's two books, and other works bearing on this period of Mesopotamian history, contain throughout them scattered tributes to Leachman. Had it not been for Major Bray these might have remained the sole memorial of his deeds to his fellow countrymen. The virtues he possessed he possessed in a marked degree. He had "rare courage, indomitable will." He worked "singlemindedly and with utter disregard of self" for the common end. It is plain, though, that he had some of the defects of these qualities. It is easy to see throughout the book instances of hasty and faulty judgment framed on insufficient knowledge of the facts. Sir Arnold Wilson says that he shared with Soane an intolerance of authority and a reluctance to conform to the not unreasonable requirements of the official machine. His reports were sometimes couched in language which verged on the insubordinate. A lot of this was excusable, for "the strain on political officers, and especially on those in the newly occupied areas, was so great that occasional temperamental outbursts were pardonable." Major Bray indeed admits and gives us examples of, outbursts of his fiery temper.

It was perhaps in his appointment of "P.O. Desert, Euphrates" that Leachman became most widely known, and earned his title of O.C. the Desert. I have heard it said that no other European has so completely looked the part when dressed as an Arab. Miss Bell describes him as a "far better leader of raids than any of their own chiefs."

Though he had travelled in, and had experience of, Kurdistan, it is plain that he was not at his best with others than Arabs, and for this reason his appointment as Military Governor of Mosul was not a success, though it was a difficult enough post for any man. Sir Arnold Wilson terminated it as he "was perturbed at the apparent lack of insight into Kurdish psychology disclosed by the circumstances surrounding the murders of Pearson, Willey, and Macdonald." The motives for Leachman's murder have never been clear. The most likely explanation seems to be, as Miss Bell said, that he "fell a victim to the personal rancour of the principal Sheikhs," though there is no clue as to what the incident was that gave rise to it.

This is not an easy book to read, and it is written in the spirit of unreasoning hero-worship, and as an impassioned tribute to a personal friend, rather than as an impartial biography. A good biography should have much in common with a good book of travel. The most important function of the latter is to serve those that come after. It should be a faithful description of the country it deals with. The author's reflections on life in general and his personal prejudices are of little help to others, differently constituted, who follow his footsteps. In the same way, surely, a biography should help the reader to leave his footprints in the sands of time. "Nothing extenuate, nor set down aught in malice." Here this book seems to me to fail, for we are reminded, almost at every page, and with too much varnish, of Leachman's virtues, which are evident enough, while his defects pass almost without comment or with an excuse. It is a pity too to compare Leachman to Lawrence, and ridiculous to do it to the latter's disadvantage. The characters of the two men were poles apart and the tasks they had to perform utterly different. Lawrence was a genius, a mystic who combined powers of leadership with vision. Leachman, in common with others in Mesopotamia, was a born leader of men and well qualified to direct and lead a movement for Arab cooperation on that front if it had been required, but one may well doubt whether he had the vision, judgment, and insight necessary to raise the Arabs, with their instinctive disunity and love of spasmodic raiding,

into a united, national revolt with a common ideal behind it. Lawrence's work lay in a country of nomads; Leachman's, at all events up to the taking of Baghdad, in a region of more or less settled tribes, whose affections were naturally fickle since their lands, as the tide of war ebbed and flowed, were to-day in Turkey, to-morrow behind our lines.

The book is also marred by needless inaccuracies, as for instance the printing of Sir A. Barrett's name as "Bane" on p. 263. W. H. I.

HISTORICAL AND COMMERCIAL ATLAS OF CHINA. By ALBERT HERMANN. Harvard-Yenching Institute, Monograph Series, vol. 1, 1935. *Harvard University Press. 79 pages of maps, 26 pages of bibliography, gazetteer and index of names*

This slim, unpretentious-looking volume, printed in Germany, brings together in concentrated form an amazing amount of useful material, the result of five years of scholarly study. The first sixty pages are given to maps, often two or more to a page—covering the period up to the opening of the nineteenth century. Starting with the distribution of prehistoric sites, they range through the dynastic periods—four successive territorial readjustments are shown, for instance, for the years A.D. 907–960—ending with Chinese Turkistan as it was in 1820. In each case the political subdivisions are outlined, locations of all identified cities are indicated, and the geographical facts of the time shown by suitable conventional symbols. City sizes are often given, the period 1280–1368 showing nine grades of urban rank. Maps of the chief city sites at various stages in history allow clear visualization of the changes they suffered under successive rules. Products and trade routes of each period are clearly indicated.

The last thirty maps deal with recent and present conditions, showing the political divisions and lines of communication, with special pages devoted to ethnographic limits, natural products, distribution of crops and livestock, industries (of which thirty-four are listed), leased territories, overseas Chinese population, and the like.

A bibliography of sources used in preparing the maps, and an index of over six thousand geographical and proper names with co-ordinate map-references, are in themselves valuable contributions to the apparatus of the student of historical geography.

The cartography is entirely adequate to the purpose of the atlas. The printing is business-like rather than extravagant, thus allowing the work to be produced at a low cost ($5.00) although many of the maps call for five printings. The registration is perfect. The style of lettering and the representation of relief showing all ranges as shaded brown caterpillars are of the kind regularly used in German publications. The letter-press and romanization however follow English usage.

As to the detailed accuracy of some of the maps there is room for slight difference of opinion, especially where generalizations have had to be made upon inadequate data. Geologists will not all agree as to the precise limits assigned to the various categories of loess deposits, or the extent of differentiated areas shown as "present forest" in Map 7. The map of prehistoric sites does not include all recorded localities although it gives a full hundred. In certain instances sources known to be secondary are credited rather than the primary source. The name Manchukuo does not appear (though this might be prophetic rather than due to the time taken to pass the plates through the press).

But such minor details do not affect the major values of the atlas as a whole. The Harvard-Yenching Institute is to be heartily congratulated on this first volume of its monograph series which will be widely welcomed. G. B. B.

AFRICA

LAKE TANA AND THE BLUE NILE: An Abyssinian Quest. By Major R. E. CHEESMAN. *London: Macmillan and Co.* 1936. 9×6 *inches;* xiv+400 *pages; illustrations and maps.* 18*s*

The vast majority of books about Ethiopia have been written by travellers with but a very brief experience of the country, often indeed with little or no experience of oriental conditions. In consequence their comments and conclusions concerning the climate, the people and their customs, and the Government are too frequently unreliable. Here however is a welcome addition to the small number of works of real authority. Major Cheesman is too well known as a traveller of ability for any introduction to be needed. He was British Consul in North-West Ethiopia from 1925 to 1934, and his knowledge of Ethiopian conditions cannot be challenged, though it is naturally more intimate for his own consular district. It is safe to say that he has seen more of northern, and particularly north-western, Ethiopia than any other Englishman, and perhaps more than any other living European, at all events until the outbreak of hostilities last year. This book describes a series of journeys undertaken with a view to assisting the general study of the great problem of the utilization of the waters of the Blue Nile, much of the course of which was unknown. He succeeded in seeing very nearly the whole of it and in making a very valuable reconnaissance map, as a result of which the essential questions he had in view have been answered.

A great many churches and monasteries are grouped round the shores of Lake Tana and on its islands, and Major Cheesman seized the opportunity to examine their libraries in hopes of adding to our knowledge of Ethiopian history. Unfortunately such a study requires much more time than he was able to spare, and it is greatly to be hoped that, when peace once more reigns, these investigations will be resumed. The book is pleasantly written under the handicap of the loss of the original manuscript and many of his notes. It is illustrated with numerous photographs and the map, in two sheets, resulting from the author's work. It is a pity that the spelling of place-names in the text does not always agree with that shown on the map. There is a misprint on p. 321, where Fudi is described as lying to the north-east, instead of to the north-west; and there appears to be a slip on p. 237, where the current of the Big Abbai near Waldagadana is said to have been swift and that a floating stick in midstream took 35 seconds to travel 30 yards, which is only 1¾ miles an hour.

In view of the frequent accusations that have been made to the effect that Ethiopia has not observed her undertaking to suppress slavery, it is satisfactory to read, on pp. 185 and 324, authentic statements of the remarkable progress that has in reality been achieved. The author is to be warmly congratulated on the amount of information obtained in the course of his travels, due largely to the satisfactory nature of his relations with the Ethiopian authorities, and on the presentation of that information in this book. E. H. M. C.

MEASURING ETHIOPIA AND FLIGHT INTO ARABIA. By CARLETON S. COON. *London: Jonathan Cape* 1936. 8×5½ *inches;* 318 *pages; illustrations and sketch-map.* 12*s* 6*d*

This is an account of the adventures, and perhaps more especially the misadventures, of an American anthropologist, his wife, and a colleague in the course of an expedition to Ethiopia and the Yemen. The story is lightly told with plenty of humour; a strong sense of humour is indeed essential equipment for any such party. It seems a pity therefore that dissertations on political

problems should have been included, particularly in view of the author's very brief acquaintance with these countries. Faith in his knowledge of such matters moreover is not increased by the confusion on p. 212 between Montenegro and Serbia.

Before leaving the United States the author met an Ethiopian student, who decided to join the party and undertook to obtain the necessary permission from the Ethiopian Government and to make all other local arrangements. This evidently led them into the initial mistake of not informing the American Minister in Addis Ababa of their plans well in advance. In the end the student proved to be an example of the type of young Ethiopian whose sojourn among western peoples had merely served to aggravate his innate xenophobia. It is therefore hardly surprising that the Government should have failed to encourage a party arriving unannounced and under such auspices. They were consequently not allowed to travel through the country as they had hoped to do and were able to achieve little work in Addis Ababa. Despite this disappointment, the author relates his tale simply and without bitterness; but some of his statements regarding conditions, for instance slavery, are quite out of date.

They then travelled to Aden and from there by dhow to Hodeida. This time they had telegraphed ahead to the Imam, and from their landing at Hodeida they found themselves his guests. A period of six weeks was spent in Sana'a and much useful work was accomplished. The first part of the return journey to the coast was in the nature of a race to regain possession of some firearms which had been left at Hodeida; these had been brought up to Sana'a by the Imam's orders, but a succession of officials and sheikhs endeavoured to prevent their delivery to the owners. Thanks to the Imam, to whom the book is dedicated, a certain amount of work was achieved at Hodeida in the face, at first, of the grudging compliance of the local Governor and later of his active hostility.

Permission to work in Saudi Arabia was refused, and the party returned to Aden, where a further series of measurements was obtained, as also at Mukalla, before starting back for America. E. H. M. C.

THE GENTLE SAVAGE: A Sudanese Journey in the Province of Bahr-el-Ghazal. By RICHARD WYNDHAM. *London: Cassell & Co.*, 1936. $8\frac{1}{2}\times5\frac{1}{2}$ *inches;* 246+48 *pages; illustrations and route-map.* 12*s* 6*d*

The author of this book of travel is a painter: and the reasons for his journey to the Sudan and his observations and reflections in the province of Bahr-el-Ghazal are those of an artist. He found all that he had been led to expect in the way of models, and more, among the Dinkas; and a great part of the book is taken up in description of the beauty and grace of his sitters and their friends and relations. It is pleasant to read a sensible and vivid account of native customs and dances written entirely from the visual, aesthetic point of view with no political, sociological, or anthropological *arrière-pensée:* and Mr. Wyndham succeeds in his plain descriptions of the complicated primitive life of the communities he saw, as well as in his brilliant painting of the naïvely destructive effects of white "civilization." His criticisms of the Sudanese Government are only implied, and they are not made impatiently: they are indeed more reflections on the inevitable unsatisfactoriness of all intercourse between "primitive" and "advanced" civilizations than an indictment of any particular system.

Mr. Wyndham writes very pleasantly and many of the descriptive passages in his book are worthy of ranking beside the literature of travel. There are some good photographs, almost entirely of the people, but no map. M. C.

NORTH AMERICA

AMERICA AFTER SIXTY YEARS: the Travel Diaries of Two Generations of Englishmen. By M. PHILIPS PRICE. *London: George Allen and Unwin* 1936. 9×5½ *inches;* 236 *pages; frontispiece.* 7*s* 6*d*

Here are set down for the general reader some impressions of a recent tour in the United States of America. Through the medium of a travel diary we receive sidelights on the current social and economic problems of that great country. The author prefaces his account with letters written some sixty years ago by his parents, when following much the same itinerary, and the whole derives additional interest from the piquant contrasts which emerge.

One is apt to look askance at such slight discussions of what are major problems, but in this case the author has an eye for what is really significant and the work as a whole is as informed, sensible and readable, as it is unpretentious.

L. R. J.

THE COLONIZATION OF WESTERN CANADA: A Study of Contemporary Land Settlement (1896–1934). By ROBERT ENGLAND. *London: P. S. King & Son* 1936. 9×5½ *inches;* 342 *pages; illustrations and maps.* 15*s*

This book provides a valuable insight into the present situation of Western Canada. In recent years, as a result of the economic dislocation, much attention has been given to the study of pioneer settlements, which have naturally been hardest hit by the depression. A thorough examination is being published in the series entitled 'Canadian Frontiers of Settlement,' volumes of which have already been reviewed in the *Journal*. Mr. England's book is useful, first as a handy summary of the problem, secondly for the material it contains derived from personal contact with typical settlers, and finally for its expression of an individual point of view.

After dealing with the geographical environment and the history of settlement since 1896, the author describes a scheme known as "Community Progress Competitions," devised to raise the standard of education, agriculture, and social activities in the non-English communities of the West, and to make them more conscious of their part in the national life. Most readers will be aware of the general character of the population of Western Canada, but the facts and figures quoted here will surprise many. In 1931, for example, there were 360,000 Slavs, of whom over one-half were Ukrainians, most of them living in homogeneous settlements, and Germans, Dutch, Scandinavians, and Hungarians are also important. Foreign settlements such as these have suffered from collapse of the wheat market, due not to restriction policies alone, but also to changes in diet of the consumers. By such schemes as that described here they have been encouraged to adopt a more varied system of agriculture, to improve the quality of their stock, and to preserve the best features of their national traditions. The value of the latter in times of stress is considerable, and is illustrated in one instance; the sums expended in State relief have often been particularly low in settlements preserving a strong national consciousness. This trend of development is very interesting as a complete reversal of the process summarized in the metaphor of the "melting-pot." Some of the expedients are no doubt temporary only: the encouragement of migration to land of lesser agricultural value, where it is possible at present to farm for subsistence alone, will raise further problems when conditions improve, but at least it is better than leaving the settlers dependent upon State relief. The attempt however to build up an organized rural life, with aims and methods of its own independently of the urban centres, holds much promise for the future. As Mr. England sums up

the position: "Rural life can only imitate urban standards at its peril . . . the pioneer can no more be paid for his isolation and hardship than you can pay a man to be shot at." G. R. C.

AUSTRALASIA AND PACIFIC

CENTRAL AUSTRALIA. By C. T. MADIGAN. *London: Oxford University Press*, 1936. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* x+268 *pages; illustrations and maps.* 12*s* 6*d*

Dr. Madigan deals not with the State of Central Australia, which existed from 1926 until 1931, but with the innermost parts of Australia generally, and with the Macdonnell Ranges, Lake Eyre, and the Simpson Desert particularly. Written for the large public now interested in the region, the book is also a summary of Dr. Madigan's own investigations into the topography, geology, and mineral resources of the country. The dual character of popular handbook and monograph does not sustain itself well. Had the book been an artistic success it might have become a classic. As it is, the geologist will read the whole with pleasure, though not without difficulty due to the inadequacy of existing maps; but the plain reader will find the geology, as Dr. Madigan himself found it, highly involved. Some form of general statement of outstanding problems which he himself has done so much to solve was necessary. It is to him that we owe our knowledge of the true nature of Lake Eyre, of the exact behaviour of sand-ridges in the desert country (see *Geographical Review*, xxvi (1936), 205–227), and of the correct structural and stratigraphical relationships of the Macdonnell Ranges. A great deal of his work was preceded by aerial reconnaissance, which has enabled him to see perhaps more of Central Australia than any man living. He knows and loves the way of life in the country, and understands its people, and his book will undoubtedly be the most authoritative statement on Central Australia for a long time to come. He seems to have read everything that has been written about the region, and has crossed and re-crossed the tracks of its explorers, appreciating the conditions under which they worked. His revaluation not only of the work but of the character of Ernest Giles and John MacDouall Stuart, and his comments on the Burke and Wills Expedition and the disappearance of Leichardt should win the respect of historians. And his sane statement of the possibilities of Central Australia should help the public he has in mind to distinguish clearly between the just admiration of stones and the folly of attempting to extract moisture from them. M. A.

POLAR REGIONS

SCIENTIFIC RESULTS OF THE NORWEGIAN–SWEDISH SPITSBERGEN EXPEDITION 1934. By HANS W:SON AHLMANN. Part V. The Fourteenth of July Glacier

All students of glaciers owe a special debt of gratitude to Professor Ahlmann for these detailed studies of the regime, or "economy" as he prefers to call it, of a typical Spitsbergen glacier. Beginning logically with an investigation of the ablation values for the glacier the expedition found that in the three summer months of 1934 there was a net loss of ice, a "negative balance." The accumulation figures, due to careful measurements of snow thickness and computations from other sources, are naturally less accurate, since the bulk of the precipitation comes in winter.

The drainage of the glacier is then described and explained; it emphasizes the fact that the rate of ablation increases very much with the retreat of the snow cover to higher altitudes as the summer advances. The measurements of

ablation were sufficiently detailed to permit an approximate discharge of thaw-water to be calculated and a curve of its variation in the season to be plotted. The most valuable part of the paper is a section on the economy of the glacier, in which the author makes a very skilful analysis of the observations made by him and Dr. Sverdrup, in an endeavour to correlate the various factors at work. The attempt appears to be completely successful so far as the measurements allow and is the first thorough study of its kind.

After a brief section on the recent recession of the glacier front there is a careful study of the movements of the glacier for which measurements at seventeen stations were made. Probably these measurements were sufficient for the deductions drawn from them as to the general course of the curves of equal movement, and no more could be got on account of the absence of suitable base-lines for the method of measurement used. The only criticism of the otherwise admirable field practice of the expedition relates to this method. It seems to the reviewer that a better way to have measured the rate of motion would have been one which is independent of base-lines and angular measurement. The theodolite is set up at the side of the glacier and directed across it to any marked feature, giving a line which can be found again. A man goes across the glacier and sets the stake on the line of sight, signalled to him by the observer. When, at a later date, the line is re-established by setting up over the same point, the man puts in a subsidiary stake on that line and measures with a foot rule to the first stake. Except in the case of a glacier which is very difficult to cross this method has many advantages over the one adopted.

The final sections of the paper, dealing with the connection between the shape of a glacier and its regime, and comparing this particular glacier with others, are of the same high standard as we are accustomed to in the scientific papers of Professor Ahlmann. Besides being a very important contribution to glaciology the paper is a brilliant example of the new attitude to the subject, in which the author has led the way, which can best be expressed by quoting the last sentence in the paper: "glaciology needs climatological observations of a special kind, and can no longer be content with the ordinarily adopted schedule." F. D.

POLICING THE ARCTIC: the Story of the Conquest of the Arctic by the Royal Canadian (formerly North-West) Mounted Police. By Major Harwood Steele. *London: Jarrolds*, 1936. 9½×6 *inches;* 390 *pages; illustrations and map.* 18*s*

The activities of the Royal Canadian Mounted Police are so diverse in type and scattered in locality that it would be hard to describe them adequately in a single volume. Major Steele confines his description to the work of the northern patrols and begins it at the time of the Klondike gold rush, fifty years after the formation of the Force.

The author has been given access to official records. He has made full use of them to provide several scores of incidents which are typical of the problems that the Royal Canadian Mounted Police have to take in their stride. There are stories with all the ingredients of a fictional thriller: a vanished man, and murder clues in the rakings of a camp fire. Others show the difficulty of impressing legal responsibility on the Eskimo who consider it nothing less than a joy-ride to be taken south to prison. There are also laconic descriptions of 500-mile sledge journeys in the depth of winter undertaken as routine patrols or to carry mail.

'Policing the Arctic' would probably have been improved from a popular point of view if its author had not sought to cover so much ground: if he had confined himself to fewer incidents and described them more fully. As it is

it is hard to picture the heroes of these incidents except as an army of strong, silent men with little variety to their excellent characters. But the author's main purpose was to give a clear, unsentimental picture of the sort of things that the R.C.M.P. have done between the sub-Arctic and 78° N., and in this he has undoubtedly succeeded. J. M. S.

CARTOGRAPHY

ALPENVEREINSKARTOGRAPHIE UND DIE IHR DIENENDEN Methoden. By R. FINSTERWALDER. (Sammlung Wichmann. Band 3 [Nr. 52]) *Berlin: Herbert Wichmann* 1935. 10×7 *inches; 82 pages; illustrations and maps. M.*4

DE L'APPLICATION DE LA TÉLÉPHOTOGRAPHIE EN TOPOgraphie d'exploration. By PH. CHOFFAT. (*Bulletin de la Société vaudoise des Sciences Naturelles.*) Vol. 58, No. 236, 1935

Scientific societies and alpine clubs have done much towards the mapping of mountainous territories. Both in Switzerland and Austria private societies made surveys and published maps before the military authorities considered the mapping of such deserted and inaccessible tracts to be within their province. In his introduction Professor Finsterwalder recalls that "for decades the German-Austrian Alpine Club has published year after year maps of the Eastern Alps. These club-maps have a peculiar position in cartography. Neither are they published officially nor are they amongst those private editions which are mostly inferior reproductions of official maps. Such a club makes rather its own surveys, employing the newest and best methods both in the preparation and publication of the maps. These maps are therefore original work, at least as good as the best official productions and in many aspects new and unique."

The history of the activities of this particular club and the methods used by its surveyors is certainly worth putting on record. Photogrammetric methods gave a great impetus to this kind of map-making, and the association of Professor Finsterwalder with the club has been most fruitful. The record of his surveys, culminating in the magnificent map of Nanga Parbat made on the German expedition of 1934, gives him more authority than any other living person to speak of terrestrial photogrammetry. But one technique only is described, and that is the one he has developed and used so successfully. This exclusiveness however, which neither discusses nor refers to alternative technique, makes the account extremely readable and intelligible.

Most of the procedure is much the same as that described in the results of the Alai-Pamir Expedition of 1928. The instrument used is the Zeiss Light Phototheodolite, which weighs 13 lb. and uses plates. The photo-objective of this camera is also used as the telescope object-glass, so that angular measurements can only be made to the nearest minute. This complicates measuring the base-length and eliminates the possibility of using a range-finding technique; it also makes it necessary to carry out a separate triangulation with a more accurate theodolite. Nevertheless all the operations such as choosing the base, laying it out, marking the end-points, measuring it and making the photographs, are described in the fullest detail, so that the interested non-expert would know exactly what to do, down to including pieces of yellow paper in his equipment.

Throughout the account certain things are laid down or assumed as fundamental. Some of us would certainly be with the author in claiming that photogrammetry is the only method of survey likely to produce the results that mountaineers or physiographers are nowadays justified in demanding. But

within the scope of terrestrial photogrammetry there is room for discussion, though none is more qualified to speak *ex cathedra* than Professor Finsterwalder. The recommended scale, 1 : 25,000, for instance, makes great demands on the personnel carrying out the work, since even with a 500-m. base, a formidable proposition in uncertain weather in difficult mountains, a depth of survey of only $7\frac{1}{2}$ km. is achieved. Many climbers would say that 1 : 50,000 was an adequately open scale; the cartographer is always biased towards a large scale, in which he may the better display his skill. Some surveyors too would prefer that triangulation and photography be as far as possible combined. Then there are such questions as whether plate or film should be used; or whether instruments of greater precision, even if they mean heavier equipment, would not actually reduce the labour in the field.

These points of criticism arise however out of the general nature of the title; there can be no doubt that, considered as a presentation of a particular way of making maps, this publication is excellent. Moreover the qualities of good writing and readability which distinguish Professor Finsterwalder's work are also extended to those sections dealing with matters outside photogrammetry, such as the completion of the map with names, its drawing for reproduction and its scientific content. The book also contains some very well reproduced portions of alpine maps showing different methods of delineating snow and rock masses.

The second account, that of the Swiss engineer M. Choffat, describes making a contoured map on the scale of 1 : 20,000 of the summit of Mont Blanc from stations 87 km. distant. His methods were very unorthodox. His camera was of a type seldom used in photogrammetry; his photographs irregular; his system of plotting quite novel. The photographs were made from the heights lying north of the Lake of Geneva with a telephoto camera, using infra-red sensitive plates and having an effective focal length of about 8 feet. The two stations, supposed to be two of a series taken along an explorer's route, were at the ends of a base $10\frac{1}{2}$ km. long, itself measured by means of a short auxiliary base. Otherwise no observations were made at the photo-stations, nor was the calibration of the camera known with any precision. By using the positions of certain trigonometrical points contained in the photographs, M. Choffat obtained both the calibration of the camera and the orientation of the photographs. These photographs could not be plotted in the usual way in an automatic plotting machine, because to reduce them to the necessary focal length would have been to give up their principal advantage. Nevertheless a plot was made on the scale of 1 : 10,000 with 10 m. contours.

The method adopted was to rectify the photographs into a vertical plane parallel to the base. Distances were then determined by simple measurements of parallax compared with a suitably drawn hyperbola. The rectification of these telephotographs could not be carried out strictly, since the optical bench necessary would have to have been of enormous length. So a "false rectification" was made, accurate only in the horizontal direction, and allowance made for it in the computation of heights. The ingenious author of this experiment makes several approximations in the course of the work; the mechanical aid to plotting from the rectified pairs also contains further slight divergences from strict accuracy.

It will be seen that the major novelty in this sequence is the rectification to the normal case, the horizontal photograph taken at right angles to the base. This is really equivalent to using a lens of very wide angle normally, or to using a portion of a multi-lens camera, in which rectification also takes place after exposure. With the ample base/distance ratio of 1 : 9 the incidental inaccuracies

do not count for very much. The contours eventually obtained by M. Choffat and reproduced in his publication have a convincing resemblance to those drawn by the mechanical plotter from ordinary air and terrestrial stereograms.

M. Choffat's disregard for convention as he springs from approximation to approximation has a certain, possibly extra-scientific, attractiveness; the comment to one of these manoeuvres, "pour plusieurs raisons, ce dispositif n'est pas rigoureux, mais les erreurs sont faibles" is the burden of the whole discourse. Professor Finsterwalder would possibly describe the paper as *anregend*, that is, intellectually stimulating; the surveyor finding routine work tedious could certainly turn with advantage to M. Choffat's paper. But whoever is preparing to make a map amongst pathless mountains would probably do better to follow the route worked out by Finsterwalder in the course of years of experience in dealing with the difficulties of terrain, weather, instrumental, and personal idiosyncrasy. M. A. S.

ECONOMIC AND HISTORICAL GEOGRAPHY

THE TRUTH ABOUT COLUMBUS AND THE DISCOVERY OF America. By CHARLES DUFF. *London: Grayson and Grayson*, 1936. 9×5½ *inches; 330 pages; illustrations and map.* 18*s*

Mr. Duff was naïve to give this title to his book; for he has by no means solved all the problems connected with Columbus. As a matter of fact it contains no more truth than any other life. He has laid special emphasis upon certain facts which were already well known and in this way has described the life of Columbus from a fresh angle. This is all to the good, but unfortunately where no sources are available he has thought fit to draw upon his imagination. This makes capital reading but will hardly pass muster with scholars.

There is one point upon which Mr. Duff may cease to worry. In Seville there exists no "great mass" of important documents waiting to be examined by scholars. All the Spanish material has long since been published by those interested, and this "great mass" exists only in Mr. Duff's imagination. There is no foundation whatever for thinking that Columbus had heard of the Norse discoveries before he left Italy. To state that there is an unbroken sequence between the two is highly incorrect. This writer would have us believe moreover that before 1492 everything about Columbus is shrouded in mystery. Certainly a great deal is, but there was all the more reason to make the fullest possible use of the four known documents covering the years 1478 to 1489. From the first of these combined with that of 1470 we know now that Columbus was born between 26 August and 31 October 1451. He was then in Genoa and stated that he was twenty-seven years of age. He had sailed from Lisbon to Madeira to purchase sugar and was returning to Lisbon from Genoa on the morrow. The other three documents are of equal importance and should have been utilized to the full.

The account of Columbus's life in Portugal is well told and there is excellent authority for having Bartholomew precede him thither. Mr. Duff thinks that on account of the grant to Telles, Columbus had to proceed to Iceland. If he did so, which is unlikely, he certainly went no farther, and even Mr. Duff leaves out the 100 leagues "beyond." Most authorities consider that Columbus could have obtained all the information given in the *Historie* in England which then carried on an extensive trade with Iceland, and that this statement should carry no more weight than any other of Ferdinand's mis-statements relating to his father's early life. Mr. Duff brings Behaim and Columbus together in Portugal. Ravenstein did not think they had met, but there is no reason why they should

not have done so in 1482. Meanwhile of course Columbus had married and lived for some time at Porto Santo as related by Ferdinand. This island is not one of the Azores (p. 49) but lies a few miles from Madeira. He had also spent some time at Funchal in Madeira, as he himself tells us (Las Casas II, 221).

We are given the traditional account of his departure from Portugal and of the years from 1484 to 1492 which he spent as a supplicant in Spain. One of the facts relating to these years which the author has thought fit to emphasize is the backing given to Columbus by Isabella's councillors of Jewish extraction. For these details he has to thank Kayserling. Although he does not call Columbus a Jew, he says these men seem to have thought Columbus was a Jew. Mr. Duff's conclusion is that his "expedition was totally financed by Jewish money" (p. 95). It was not however financed privately, but out of public funds, those of the Sancta Hermandad, loaned to the State which had been carrying on an exhausting war against the Moors. This has been known for years.

Mr. Duff is quite wrong again in thinking that Abraham Zacuto's *Tables* were Columbus's "constant companion" (p. 89). How could they be when they were first printed in 1496? Müller's *Kalendarium* was issued in 1476, and as he had been Behaim's teacher, it has generally been held that his work had been used by Columbus. The figures relating to the cost of the expedition seem to be taken from Thacher's work. In fact Mr. Duff has garnered a good deal from his predecessors. It is all the more remarkable therefore that he should dismiss their translations so discourteously. These he finds either "incredibly inaccurate or incredibly wooden" (p. 9). In reality those of Markham, Thacher, and Jane are first rate, while Mr. Duff has merely re-translated a few extracts and these are not always perfect. He might have shown that it was d'Ailly who directed Columbus to sail from the Canaries and not directly westward from Spain.

In his translation of extracts from the Journal of the first voyage Mr. Duff rather belittles Columbus's knowledge of navigation. He is forced to admit of course that on the return voyage Columbus's reckoning alone was correct. By 1503 he had become a "consummate seaman" (p. 287). The question of Columbus's seamanship will always remain a debatable one. Mr. Duff would have found some additional material relating to the Pinzons in Vignaud's large work. It should be pointed out that Martin Pinzon's landfall on his return was not Bayonne in France but Bayona in Galicia near Vigo.

The account of the second, third, and fourth voyages leaves nothing to be desired and a long extract is given of Columbus's description of his third voyage along the coast of South America. That Columbus was in search of gold we know quite well. La Roncière has gone so far as to make him the agent of the Italian bankers! In any event he was clearly disappointed at the small yield of gold when Marco Polo's description had led him to expect so much. The fourth voyage was certainly a tremendous strain upon Columbus, and in view of the death of Isabella and the attitude of Ferdinand towards his very legitimate claims, it is hardly to be wondered that he became disheartened.

The weak side of Mr. Duff's book is his insistence on certain not too well-authenticated facts and his attempt to fill up gaps in the narrative by speculations. There is no record of any such sermon as that he makes Father Perez preach on the eve of Columbus's departure nor do we know anything of his arrangement with the Pinzons. To speak of "boodle" in this connection seems a mistake. There is a certain freshness of outlook in the book, but the title is clearly a misnomer. From it one expected some new and startling facts and none is forthcoming.

The bibliography is disappointing. Harrisse himself was ashamed of his

Notes which are of no value whatsoever. Winsor's book is only useful for the illustrations. What one misses is any reference to Vignaud's 'Grande Enterprise,' which would have helped Mr. Duff a good deal; for it lays particular stress upon the earlier period of Columbus's life. It also deals fully with the Councillors of Jewish descent. The two volumes by the Duchess of Berwick issued in 1892 and in 1902 have also been omitted. Time will probably soften his attitude to his predecessors. He has used Kayserling widely but should realize that it is thanks as well to the labours of Duro, Harrisse, Thacher, Vignaud, and others that our knowledge of Columbus's life is so full as it is. Of the possible interpretations of that life there will be no end, and each will contain some of the truth. H. P. B.

RIVER NAVIGATION IN ENGLAND, 1600–1750. By T. S. WILLAN. *London: Oxford University Press*, 1936. 9×5½ *inches;* 164 *pages; sketch-maps.* 10*s*

This book is excellent as an historical study, but the writer fails to take sufficiently into account the more geographical aspects of his subject. For example, the probable regimes and gradients of individual rivers are not discussed, although subjects such as these would appear to be almost as important to the historian describing the navigable rivers of England as they were to the engineer concerned with their regulation. It is not easy to reconcile with each other the first three of the five maps which the book contains. F. R. G.

THE LAND: Now and To-morrow. By R. G. STAPLEDON. *London: Faber and Faber*, 1935. 9×5½ *inches;* xviii+336 *pages; illustrations and maps.* 15*s*

This book goes far beyond its title; it is at once a philosophy of life and a practical guide book to the land of Britain and its possibilities. Farmer Stapledon, although he has achieved world-wide fame as Professor Stapledon, of the Welsh Plant Breeding Establishment and Britain's expert on grassland, is still more at home on his Welsh hill farm than perhaps anywhere else. His book is intensely egotistical; not only is it written in the first person throughout, but it quite frankly expresses the author's own opinions: opinions which he has come to hold through long-continued personal contact with the land and all its problems at first hand. He admits that he hates politics, never reads political articles, distrusts much of modern economics, despises the narrow financial view and prefers reasoning with himself rather than even with his fellow savants. But he is no theorist. Throughout he is intensely practical, and in his love of the country and his patriotism to his own country he is never blind to the practical difficulties of real life. Professor Stapledon sometimes comes to town in the farmer's garb of breeches and gaiters. In this book he does the same thing: he perhaps imagines that there is a greater difference between the black-coated city worker and himself than there really is. If the book has a fault it is the supposition that the town dweller will be out of sympathy with the views expressed.

The book deals essentially with the utilization of the land of Britain from the national point of view—the heritage of all being used for the benefit of all. There is an inherent love of nature and the country in all: the growth of hiking and gardening is abundant evidence of this, but the garden city mentality is itself a danger. What is needed is a vigorous agriculture so that the country will still offer contrasts to the urban environment however improved the latter may be. *Ad hoc* marketing and quota schemes may temporarily benefit agriculture, but they may result in land being put to wrong uses—to land-spoiling rather than to land improvement. The key-note of the book is the conditioning

or re-conditioning of land—to up-grade the farm and grazing land of the whole country and to provide adequate and modern housing conditions for man and beast. The emphasis is on the immense area of Britain awaiting improvement merely by a direct attack on existing vegetation. "Rough grazing" alone occupies more than a third of Britain, and no one has shown more convincingly than the author how much of this can be improved with ease. Another third of Britain is under permanent grass yet "there is relatively little first-class grassland in the country." What of the cost? In a short but significant chapter it is shown that £12,000,000 *only* would be needed to up-grade and utilize to the best advantage all the land of Wales suitable for the purpose, and twenty years is regarded as over generous for the final liquidation of all loans in connection with the programme. When calculating cost of land reclamation schemes do we sufficiently consider posterity *qua* posterity? Professor Stapledon thinks not; it is we who have reaped the benefit of much that the Romans did in England, not forgetting the reclamation of Romney Marsh.

Whilst few will agree with the curious calculations designed to show that unless something is done there will be no country left in Surrey in a generation, or in the whole country in a few hundred years, and others will find some of the assertions in the chapter on "Education" rather unjust, we can all read with interest the chapter on "My National Park." Two folding maps are given of the proposed park in Central Wales; it is not the National Park of American model which is envisaged, but rather a typical section of Britain where the town dweller may see rural life at its fullest and best—good farming in full swing—land reclamation and land improvement bringing the joy of achievement to the farmer and the labourer. Professor Stapledon welcomes the town visitor, he lauds the Youth Hostels Association, he wants Trade Guild (Holiday) Estates (estates purchased for the benefit of their employees by great business concerns), Long Week-end Allotment Associations and "Primitive" Golf-courses for the masses. In common with all scientific investigators he realizes the urgent need for more and more exact knowledge; he has a number of kind words for the work of the Land Utilization Survey (incidentally many of the improvements he suggests have already been put into effect) and urges the formation of a Ministry of Land, since the land as such is not at present the care of any Government department. No one should miss this well-informed, thoughtful, yet provocative book. L. D. S.

GENERAL

UM DEN GIPFEL DER WELT: die Geschichte des Bergsteigers Mallory. By WILHELM EHMER. *Stuttgart: J. Engelhorns Nachf.* 1936. $7\frac{1}{2} \times 4\frac{1}{2}$ *inches;* 186 *pages; illustrations and map*

This book professes to be the story of Mallory the mountaineer; it is in fact a record of the 1924 attack on Mount Everest, into which memories of the 1921 and 1922 expeditions are interposed. The account contains the imagined thoughts and utterances of most members of the expedition, and in particular those of Mallory and Irvine. Some of this matter seems far-fetched and improbable, especially in the light of David Pye's memoir of Mallory. But the latter part of the book, as the account approaches the final tragedy, is better in as far as the author refrains from elaborating dialogue. The earlier chapters are coloured by what the author himself describes as his inspiration by Mallory's character.

It is of course difficult for an author to depict characters of another nationality: an occasional tendency for the dialogue to lapse into the terms of a German officers' mess cannot be corrected by the spasmodic use of English words and

expressions. But a young German reader would obtain from this book a very intelligible idea of the scenery of Tibet and the conditions of a Mount Everest expedition. While much incident, such as getting up the North Col, spending the night in a high camp and Norton's terrible snow-blindness, is most impressively described. E. H. S.

HYLLNINGSSKRIFT TILLÄGNAD SVEN HEDIN, på hans 70-Årsdag. (I serie med Geografiska Annaler, Årg. XVII, 1935.) Stockholm: Generalstabens Litografiska Anstalt, 1935. 10×7 *inches;* xvi+686 *pages; illustrations and maps.* 25*Kr.*

This thick anniversary volume was presented to Dr. Hedin by 450 personal friends and organizations to commemorate his seventieth birthday. It contains fifty papers by scientists each working in some field of study touched by the researches of the veteran Swedish explorer. The bewildering variety of topics bears testimony to the width of his interests. The contributions range from brief *novitates* describing new species to twenty-page discussions of ethnological and meteorological problems. No system is detectable in the arrangement of the papers beyond a tripartite alphabetical listing by authors. The resulting juxtapositions place Roger Bacon between the structure of Asia and the races of the Indian hinterland, followed by the climatic influence of Lake Baikal.

To comment on each of the half-hundred papers in the volume is out of the question. Here it must suffice to mention only those that bear directly on current geographical problems, though virtually every paper is in some sense related to geography.

Leaving out of account therefore important papers on stratigraphy and palaeontology by such authorities as Halle, Norin, and Teilhard (who summarizes the geological results of the Haardt-Citroen Expedition through Central Asia), and de Geer's transbaltic extension of the Swedish time-scale by varve-correlation of Gotiglacial and Daniglacial deposits in Denmark and Poland, we come to Chaney's paper on late Tertiary climate. From a study of the Kutcha flora, Chaney maintains that the conditions were only slightly more humid than those of to-day and that uniformity, meteorological and topographic, was as widespread in central Asia and western North America as they are at present.

Haude (*Grenzen verschiedener Trockenklimate in Zentralasien*) finds that, by adjusting with an altitude factor of 14, there is a good correlation between Koeppen's arid climate zones and the distribution of vegetation. Haude maps the limits of the various belts, showing Central Asia as a desert and steppe-desert unit with marginal strips of *Weidesteppe* (prairie steppe) and *Ackerbausteppe* (arable steppe), surrounded by broad expanses of boreal climate on the north, east, and south-east, and tundra on the south.

A paper by Hoerner and Chen on Alternating Lakes shows the correctness of Hedin's early interpretation of Lop Nor as a "wandering lake." In regions of extremely subdued topography, shallow terminal lakes depend for their existence on continued supply from streams. As heavy sedimentary discharge blocks their courses, such streams seek new channels and shift their courses radically. Failing to appreciate these conditions of fluvial alluviation, observers have often mistakenly assumed that the extensiveness of deposits implies lakes of large area in comparatively recent times. Actually Lop Nor and Etsingol are only two examples of what is probably a not uncommon feature, river changes and lake displacements being due mainly to sedimentation and wind action. Once displacement has occurred, erosion by running water and wind soon cuts the old deposits into yardangs, while aeolian forces find material for sand dunes

and loess deposits. The great period of loess formation however belongs to the Pleistocene period and followed the drying up of older, more extensive lakes, of which the Tarim lake is the outstanding example.

An important paper by Huntington on Climatic Pulsations is a reply to the R.G.S. Centenary addresses by Penck and Gregory. Kincer's twenty-year overlapping averages demonstrate a progressive rise in mean temperature for north-eastern U.S.A. and southern Canada during the last forty years. Accepting the existence of short-period cycles, Huntington seeks support for Simpson and Brooks' belief in climatic cycles of considerable magnitude. The crux lies in the question whether regions now too dry for agriculture were once moist enough to support considerable populations.

Hellman's analysis of the writings of Claudius Ptolomaius shows that early in the Christian Era Alexandria was subject to cyclonic disturbances as it no longer is to-day. Huntington deduces that there has been a shift of depression tracks to the north. Alexandria, being in a zone of rapid climatic transition, is well situated to show the effects of such a shift. Corroborative evidence is seen in the differences of orientation in ancient and modern dunes noted by Wingate in the Libyan Desert.

Huntington has examined the impressive abandoned irrigation systems in Peru which were first discovered by aerial surveys. "For mile after mile and to altitudes of hundreds of metres above the river, every slope is covered with terraces, canals and ancient villages. These neglected and undescribed evidences of a former dense population extend for kilometres on all sides." Their abandonment cannot be due to crustal uplift of the Andes, as ruins of similar age occur at sea-level. Nor can we blame the change from agricultural to pastoral life, since Peruvians to-day cultivate even the poorest of their land where water is obtainable. Similarly the distribution of abandoned sites found by Zeigler and Musil in Palestine is compared with that of present-day villages. The data are analysed at some length and Huntington shows that settlements to-day steadily decline in numbers from north-west to south-east, in contrast to a relatively uniform spread of population in former times. The conclusion is that desert conditions extending from the south-east have rendered previously populated districts progressively less habitable.

Huntington then attacks the tacit assumption that abandoned districts would be reoccupied, given propitious human conditions such as absence of interference from nomadic raiders, recovery of lost agricultural skill, and actual need of increased acreage. In the regions discussed he finds the assumption contrary to fact. Where the presence of multiple river-terraces appears to confirm an assumption of cyclic change of climate, corroboration over a wide area by inter-valley correlation is essential, to rule out the possibility of local factors being responsible. Huntington cites an example from the Tian Shan where he found a nine-terrace system in one locality while adjacent districts had valleys with one.

One section of the paper deals with the physiological effect of seasonal changes. Man's physiological reaction to seasonal changes in temperate latitudes shows up well in graphs of birth and death rates, and in the fluctuating piece-work output of factories. It may be assumed that man's gross adjustment to altered mean values of climatic factors is of the same type. In discussing man's response to climate in the past he finds that at certain epochs the cycles brought to ancient centres of civilization unusually favourable climatic conditions which not only met their cultural requirements but gave the advantages of a more variable climate found to-day in the North Sea region. A section of the paper is devoted to meeting the arguments of Gregory and Penck in favour of minimizing the importance of saecular changes of climate. The

highest civilization, he concludes, always develops where the climate approaches most closely the optimum for the existing stage of culture.

A paper by Ting on the alleged drought and desiccation in China is noteworthy as presumably the last contribution from the pen of the remarkable man whose recent death is a severe blow to the cause of science in the Far East.

A systematic classification of dunes is given by Aufrère (*Essai sur les dunes du Sahara Algérien*) and applied to the Eastern and Western Erg, the dune forms in the latter being the more complex. The wind-rose is used as a primary criterion in grouping the various types of dunes, symmetrical and asymmetrical, according to whether sand-movement is governed by winds of constant, alternating-opposite, or mutually oblique directions. Distinctions are drawn between dunes of transgressive origin and those primarily of reworked local material. Major and minor forms are recognized. Allowance is made for grain calibre, dune composition, local humidity, and other variable factors.

Glaciology is represented by Ficker's paper on the western Pamirs and Ahlmann's description of the "ablatograph" used to record loss by melting and evaporation from snow and icefields. This instrument, used in Sverdrup and Ahlmann's Spitsbergen expedition (1934), employs a Devik recorder placed on deeply embedded stakes (within levelling distance of a rock outcrop or other fixed point) which graphs the rate of descent of a "float" attached to the machine by a fine cord. Failing to find material of thermal properties identical with snow or ice, Ahlmann used a 9-cm. wooden hemisphere, painted white; corrections were applied for excessive absorption of heat by the float during the midday period of strongest radiation. He advocates substituting a fine chain for the cord to reduce humidity effects on the length of the latter.

In "A Day in North Greenland" Koch gives the results of an aerial reconnaissance (1933) from Danmarkshavn to Peary Land, involving four traverses of Crownprince Christian Land, and presents new data on the topography, geology, and ice conditions. Poor visibility during a critical period of the flight prevented further light being thrown on the possible existence of land between Greenland and Spitsbergen.

A superb example of the climatic influence of enclosed lake basins is brought forward by Defant, who uses recently published records of the U.S.S.R. Geophysical Central Observatory to map the mean temperature conditions for December and July in the vicinity of Lake Baikal. The sharp distortions of the isotherms conforming precisely to the outline of the lake are among the most striking in the world.

Archaeology, ethnology, and related subjects are represented by papers on Turkoman antiquities (Arne), the Gobi in the times of the Hun conquests (Herrmann), Potala (Montell), lamaistic rituals (Lessing), Shaman dress (Lindgren), bulwarks in Gotland (E. H. de Geer), and spiked wheel-traps (Lindblom). Several reports cover the scientific results of Sven Hedin's own recent expeditions in the fields of ethnography (Linne), entomology (Sjostedt), and general reconnaissance (Thordemann and Asklund).

A list of publications in twenty-three languages from the pen of the explorer himself occupies twenty pages, and covers a long span of active life to which the present volume is a worthy tribute. G. B. B.

THE MONTHLY RECORD

GEOMORPHOLOGY OF CZECHO-SLOVAKIA

Dr. Vladimír J. Novák has recently published in English some interesting notes on the geomorphology of Bohemia ["The Bohemian peneplain," *Věst. Král. Čes. Spol. Nauk. Tř.* II, *Roč*, 1936]. In the Bohemian massif flats at different altitudes, often far above the present valley floors, bevel steeply inclined old strata and intrusive rocks. Oligocene deposits here and there, also at different altitudes, indicate a Middle Oligocene plantation, Upper Oligocene marine regression, and severe diastrophism in Bohemia itself. The movements ended the planation and the peneplain was broken into sections which were differentially elevated and depressed. Flat relief in the Bohemia-Moravian highlands is considered to be of the same age as that of the Ore Mountains (Erzgebirge). Dr. Novák regards as certain the former existence of more than one older planation in the massif, but expresses strong doubts as to whether anything remains of the old relief in the present surface features; *i.e.* he attributes variation of elevation to the diastrophic breaking up of the Middle Oligocene peneplain.

THE RIO PLOMO ICE-DAM

A commission of the Argentine Touring Club in 1935 investigated the Rio Plomo Ice-dam (see the paper by Colonel King in the *Journal*, vol. 84, p. 321) and issued a report on it, signed by Dr. F. Reichert, Señor Ruzza, and Señora von Rentzell. In this the theory was put forward that the ice had advanced slowly between 1912 and 1927, and not suddenly in 1933, as suggested by Dr. Helbling (see the *Journal*, vol. 85, p. 41). They considered that the ice had blocked the valley in 1927 and that a lake had formed every year behind the ice, escaping gradually except in January 1934, when the flood occurred. Photographs taken by the Instituto Geografico Militar, and a map prepared from them, have been received from Colonel King, clearly demonstrating that in 1928 the glacier ended above the 3250-metre contour, which was its position in 1910, and at least 750 metres from the Rio Plomo and possibly more, since the photographs do not show the glacier at all.

FULGURITES IN NORTH AND SOUTH CAROLINA

Although the glassy tubes of fused sand known as fulgurites have been recognized for more than a century as the work of lightning, most of the published descriptions thereof refer to single occurrences. In a paper entitled "The Origin and Occurrence of Fulgurites in the Atlantic Coastal Plain," which appears in the *American Journal of Science* for March 1936, Mr. Julian J. Petty gives an interesting general account of more than a hundred tubes collected by him in North and South Carolina. All the specimens were obtained from pits in a broken range of low Cretaceous sand hills on the inner margin of the Coastal Plain. The tubes are common throughout the Sand Hill belt occurring for the areas examined with a density of several to the acre. As the Sand Hills are quite inconspicuous and devoid of ironstone, which is known to attract lightning, the abundance of the fulgurites is attributed to the purity and dryness of the sand together with the probability that their formation in the area has been taking place over a long period of time.

The larger tubes usually follow a tortuous, roughly vertical, downward course through the sand and are quite commonly twenty to thirty feet in length. From one pit at Dixiana, South Carolina, tubes have been traced down as far as sixty

feet beneath the surface of the sand. Externally the fulgurites resemble shrivelled roots to which sand has adhered, the outer surface which is rough and irregular appearing much like the sand from which they are formed. The internal surface, on the other hand, is smooth and glassy but exhibits irregularities of conchoidal appearance. The average diameter of the tubes is about three-eighths of an inch, but no relation seems to exist between the size of a tube or its bore and the thickness of the wall. The path followed by the lightning through the sand is in general like the path of lightning in the atmosphere between cloud and earth, some discharges following a single path, others branching and rebranching paths. The length of the tubes depends on the intensity of the lightning discharges and the thickness of the sand layer which acts as a dielectric, whilst the ground-water table or a wet stratum determines the downward limit of fulgurite formation.

Experiments made on the production of artificial fulgurites support the theory that the hollowing out of the tubes is due to the expansion of air and moisture along the path of the discharge. When this is great in proportion to sand melted a large-bored, thin-walled tube results. The glass composing a fulgurite is commonly colourless, gray or black, but a zone of reddish sand about a quarter of an inch thick usually surrounds the fused material.

The paper is illustrated by a number of photographs of fulgurites together with an artificial one made by passing electric current into sand. The author considers that systematic investigation with electric currents would yield valuable information concerning the details of fulgurite formation since it is now possible to produce currents of great energy content even approaching actual lightning conditions.

THE AUSTRALIAN TEKTITES

The glassy bodies known as tektites have been a subject of scientific interest for nearly a century, and latterly our knowledge of them has been summarized by Professor Suess who strongly supports the theory that the bodies are glass meteorites (*Die Naturwissenschaften*, vol. XXI, 1933). Tektites under various names are found in many parts of the world, but those which are peculiar to Australia, designated australites, appear to be more numerous as well as much more distinctive than any other class. In two papers published in the *Transactions and Proceedings of the Royal Society of South Australia* (vols. LVIII and LIX, 1934 and 1935), Dr. Charles Fenner, of the University of Adelaide, describes the australites according to a large and representative collection belonging to Mr. W. H. C. Shaw, of Perth, W.A., and discusses their numbers, forms, distribution and origin. These bodies have been found abundantly in all the more southern parts of Australia, and all Mr. Shaw's specimens, which number nearly 4000, were collected on the arid Nullabon limestone plain stretching for over a hundred miles along the shores of the Bight and now traversed by the Trans-Australian Railway. One of the most characteristic features of australite forms, in contrast with those of any other tektite group, is the almost invariable equatorial rim or flange that encircles each form, separating two surfaces of distinctly different character. The forms fall into a small number of well-defined types, round, oval, dumbbell shaped, etc., and the genetic relationship between these types is discussed on the assumption that meteorites of this particular composition underwent fusion on the front surface in spinning through the atmosphere with the development of a flange or rim.

Dr. Fenner sums up the evidence for concluding that the australites arose as a unique shower of glass meteorites, or tektites, which came once only and in Southern Australia only. This relates to their chemical composition quite distinct from any terrestrial rocks and from other tektite series; to their small

series of curious form-types, unlike any known petrological objects, even those of other tektite series; and to their definite restriction to Australia, and to that part of the continent south of a particular line. The evidence further suggests that the shower occurred in a geologically recent but historically remote period, and that the total number of australites which fell was between one and ten millions.

In a note which appeared in the *Journal* a few years ago (vol. 71, p. 610) on the class of tektites known as Darwin glass, occurring in Tasmania, reference was made to the Great Circle distribution of tektites in general.

ARGENTINE NATIONAL PARK

In the June number of the *Revista Geografica Americana* there appeared an interesting article on the Argentine National Park of Nahuel Huapí. The nucleus of the present park, which covers an area of 785,000 hectares, was presented to the Argentine Government rather over thirty years ago by Francisco P. Moreno. Nahuel Huapí lies at the foot of the Andes, on the Argentine–Chilean frontier, and consists of a chain of lakes, of which the largest has given its name to the park. The problems of transport from the western seaboard, and of accommodation for visitors, were difficult; but they have been well dealt with by the Government, and there are now several good motor roads inside the park itself, hotels at Llao-Llao and Bariloche, and châlets along the shores of Nahuel Huapí itself. Every kind of sport, including winter sports in the Cerro Lopez, are provided for and a large number of Argentines visit the park annually. Mountaineers often use Puerto Blest as a base for climbing the Tronador (3460 metres). The vegetation, especially the trees, is very rich; but probably owing to the strong, icy winds which blow from the Andes in the winter, there is very little animal life. In the lakes only one kind of fish is indigenous, the *puye;* but a zoological and botanical research station has been set up on the Isla Victoria in Nahuel Huapí, and experiments in acclimatizing trout and salmon have been successful.

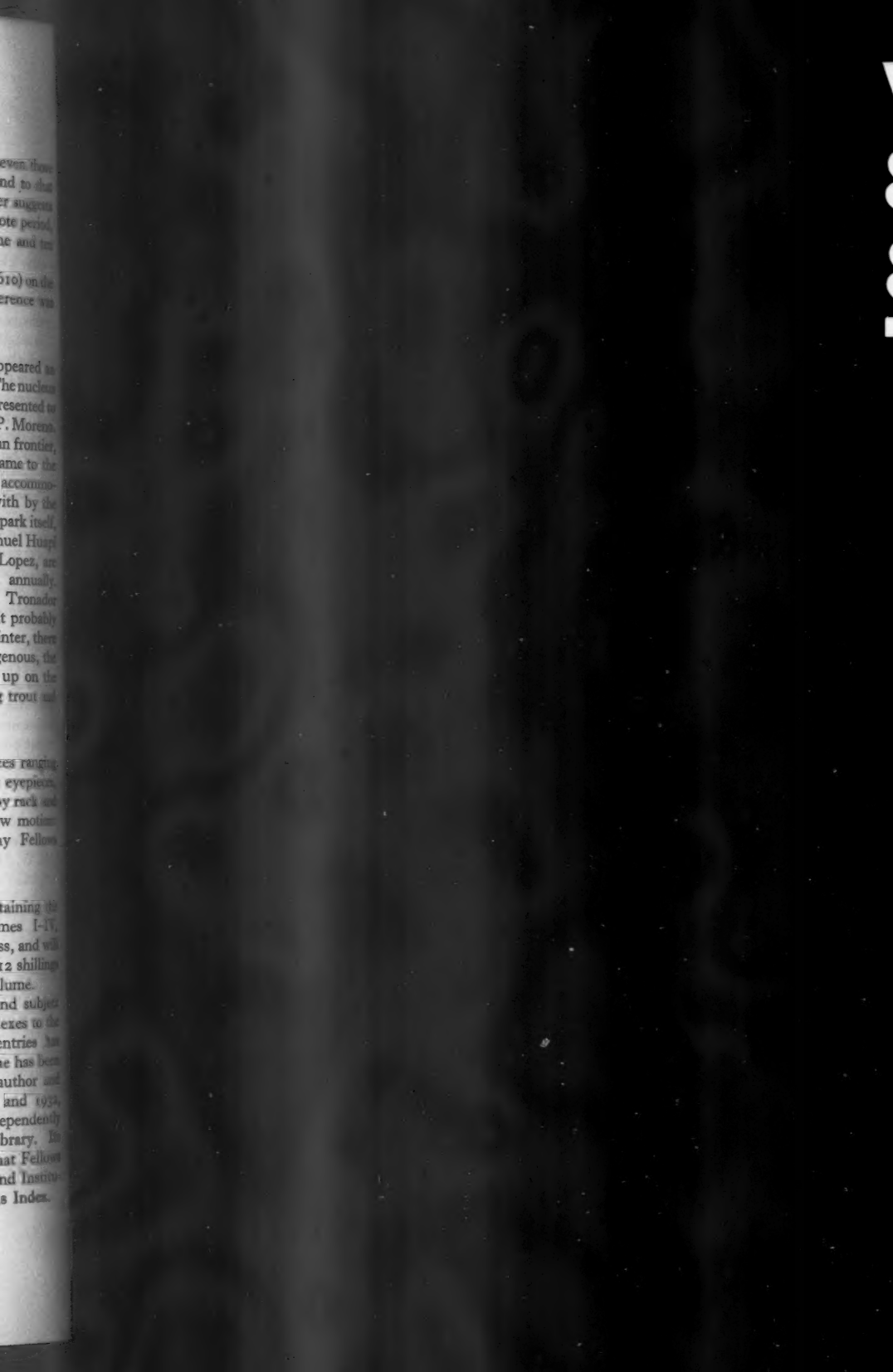
DISPOSAL OF TELESCOPES

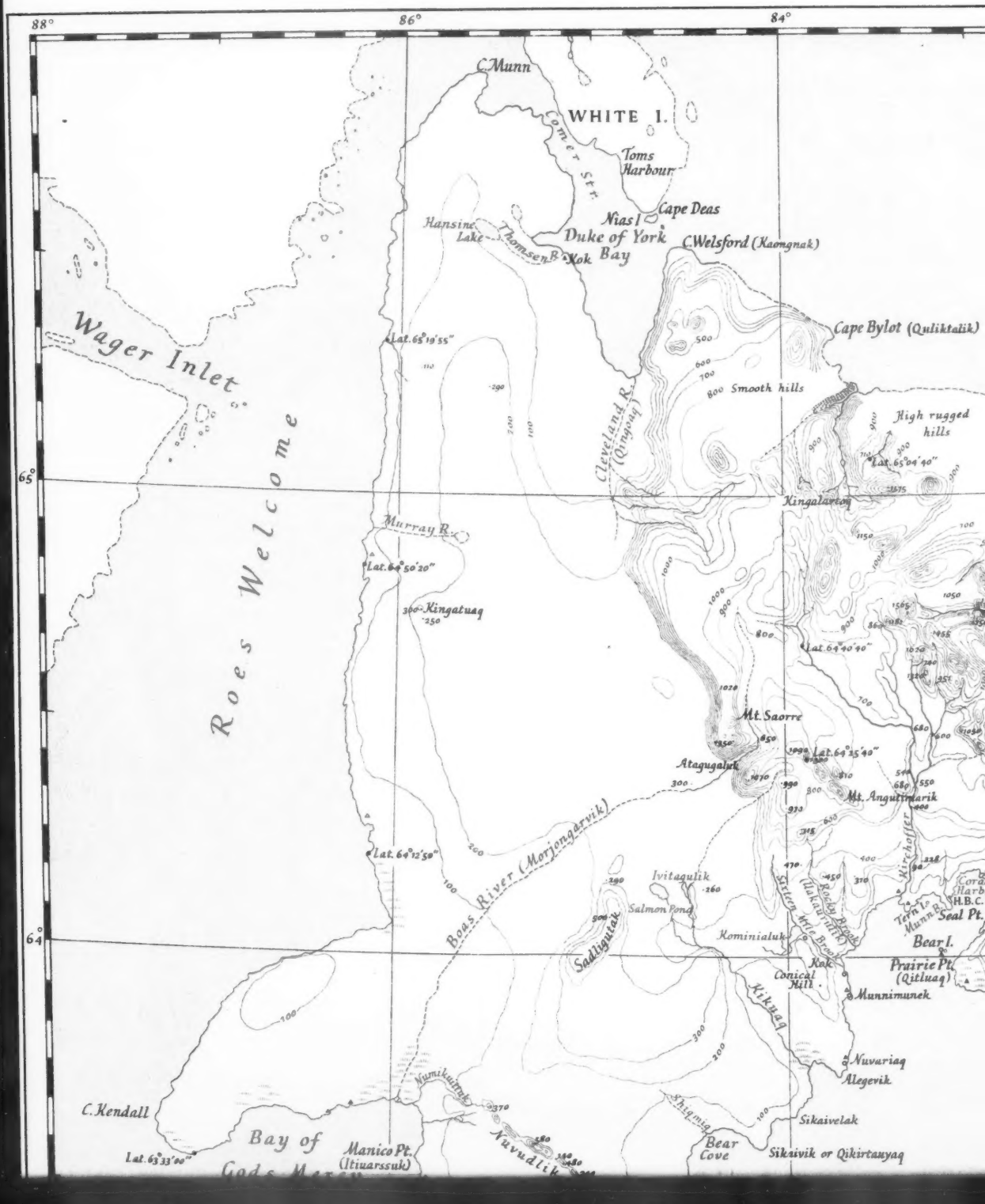
The Society has a few telescopes for disposal to Fellows, at prices ranging from £5 to £10. These telescopes are 3-inch: some with varying eyepieces, yielding powers approximately 40 to 80 magnifications: focussing by rack and pinion: horizontal and vertical movement control, some with slow motion: complete with oak tripods and wooden case for telescope. Any Fellow interested should apply to the Instructor.

INDEX TO SUPPLEMENTS

The Index to the Supplements to the *Geographical Journal*, containing the bibliographical lists of 'Recent Geographical Literature,' volumes I–IV, numbers 1 to 41, covering the years 1918 to 1932, is now in the press, and will be published next month. The price of the volume is 16 shillings (12 shillings to Fellows at the House of the Society) plus 6*d.* postage for each volume.

The general arrangement of the volume, which is an author and subject index in one alphabet, is similar to that followed in the General Indexes to the *Geographical Journal*, though the classification of the subject entries has required some development. All the literature indexed in this volume has been placed in the Society's Library; it forms therefore an abridged author and subject catalogue of the additions to the Library between 1918 and 1932, including articles in periodicals as well as books, and can be used independently of the Supplements as a guide to a considerable portion of the Library. Its preparation has been a heavy cost to the Society, and it is hoped that Fellows possessing sets of the Supplements or wishing to use the Library, and Institutions receiving the Supplements, will co-operate by purchasing this Index.




88°
86°
84°
65°
64°
C. Munn
WHITE I.
Comer Str.
Toms Harbour
Nias I
Cape Deas
Duke of York Bay
C. Welsford (Kaongnak)
Hansine Lake
Thomsen R.
Kok
Wager Inlet
Roes Welcome
Lat. 65°19'55"
Cape Bylot (Quliktalik)
Smooth hills
High rugged hills
Cleveland R. (Qingvaq)
Lat. 65°04'40"
Kingalariaq
Murray R.
Lat. 64°50'20"
Kingatuaq
Lat. 64°40'40"
Mt. Saorre
Lat. 64°35'40"
Atagugaluk
Mt. Angutimarik
Lat. 64°12'50"
Boas River (Morjongarvik)
Ivitaqulik
Salmon Pond
Sadliguiak
Kominialuk
Sisters Mtns
Rocky Brook (Ilakarmiut)
Kirkhoffer
Tern I.
Munn R.
Seal Pt.
Bear I.
Prairie Pt. (Qitluaq)
Conical Hill
Munnimunek
Kikuaq
Nuvuriaq
Alegevik
Sikaivelak
Sikaivik or Qikirtauyaq
Bear Cove
Shiqmiq
Mumiluarmik
Nuvudlik
Manico Pt. (Itiuarssuk)
C. Kendall
Bay of Gods Mercy
Lat. 63°33'00"

82°
80°
N.W. TERRITORIES
SOUTHAMPTON ISLAND
to accompany a paper by T. H. Manning
Scale 1/1250000
Miles
5 0 5 10 15 20 25 30 35 40
Kilometres
10 0 10 20 30 40 50 60
Eskimo stone ruins, observed ▲ reputed △
Semi-permanent eskimo camps ○
Marshland
Heights in feet
Approximate contours at 100 ft. intervals
(Quliktalik)
Cape Comfort
high rugged hills
65°
Porsild Mts.
Cape Fisher
Lower land sloping towards the coast
Koujak
Fox Channel
Mc. Murdo Point
Tassialuk
Tuktutoq
Terror Point
Coral Harbour
H.B.C. Post
Itiuarshuk
Rokshurtoq
Seal Pt.
Bear I.
East Bay
Gore Pt.
Nalojoaq
64°
Mt. Minto
Saunders Pt.
Gorden Bay
Native Bay
Bell Peninsula
Sea Horse Point (Aiviq)
Back I.
Native Pt. (Tunirmiut)
Imerqutailaq
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Kigushuk
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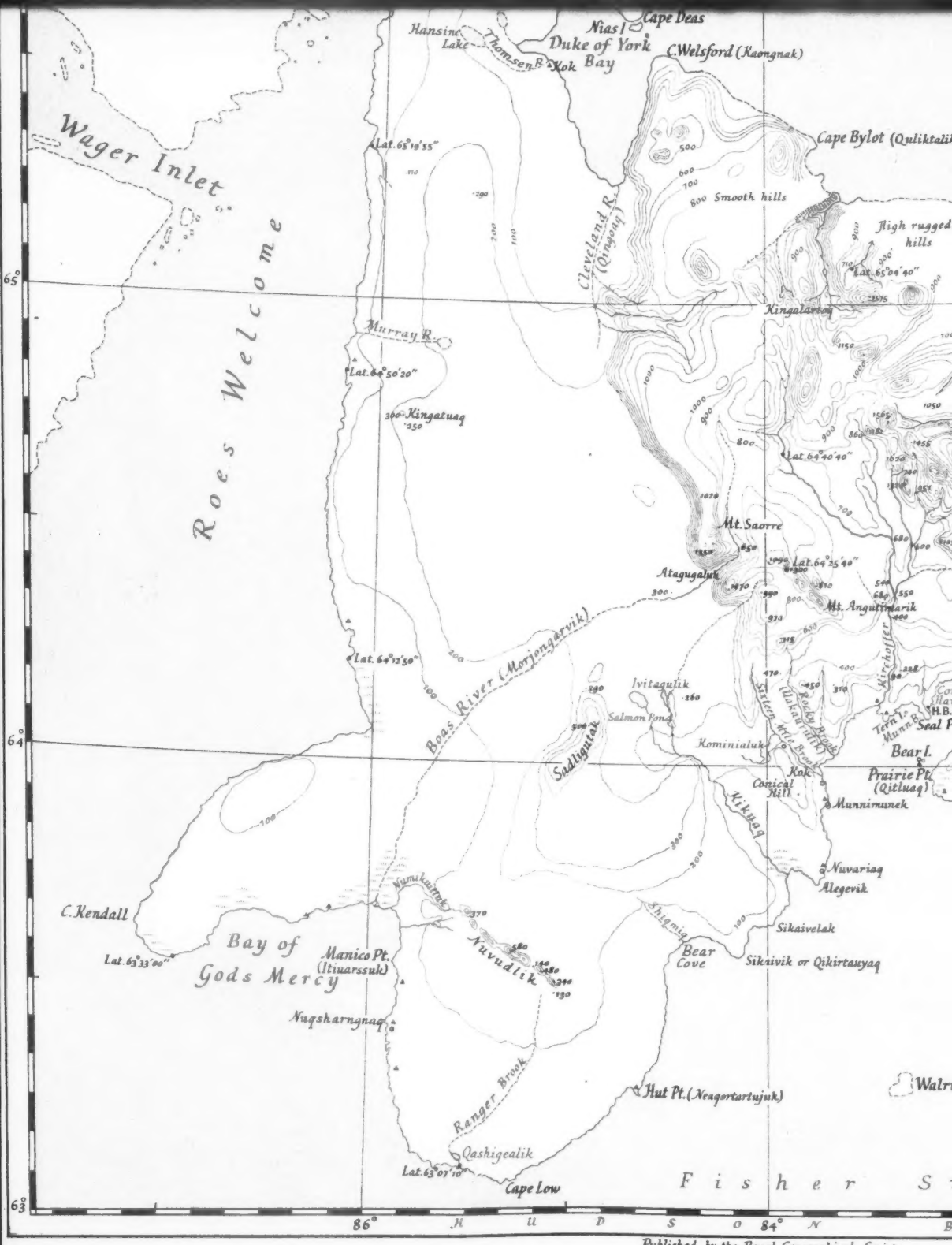

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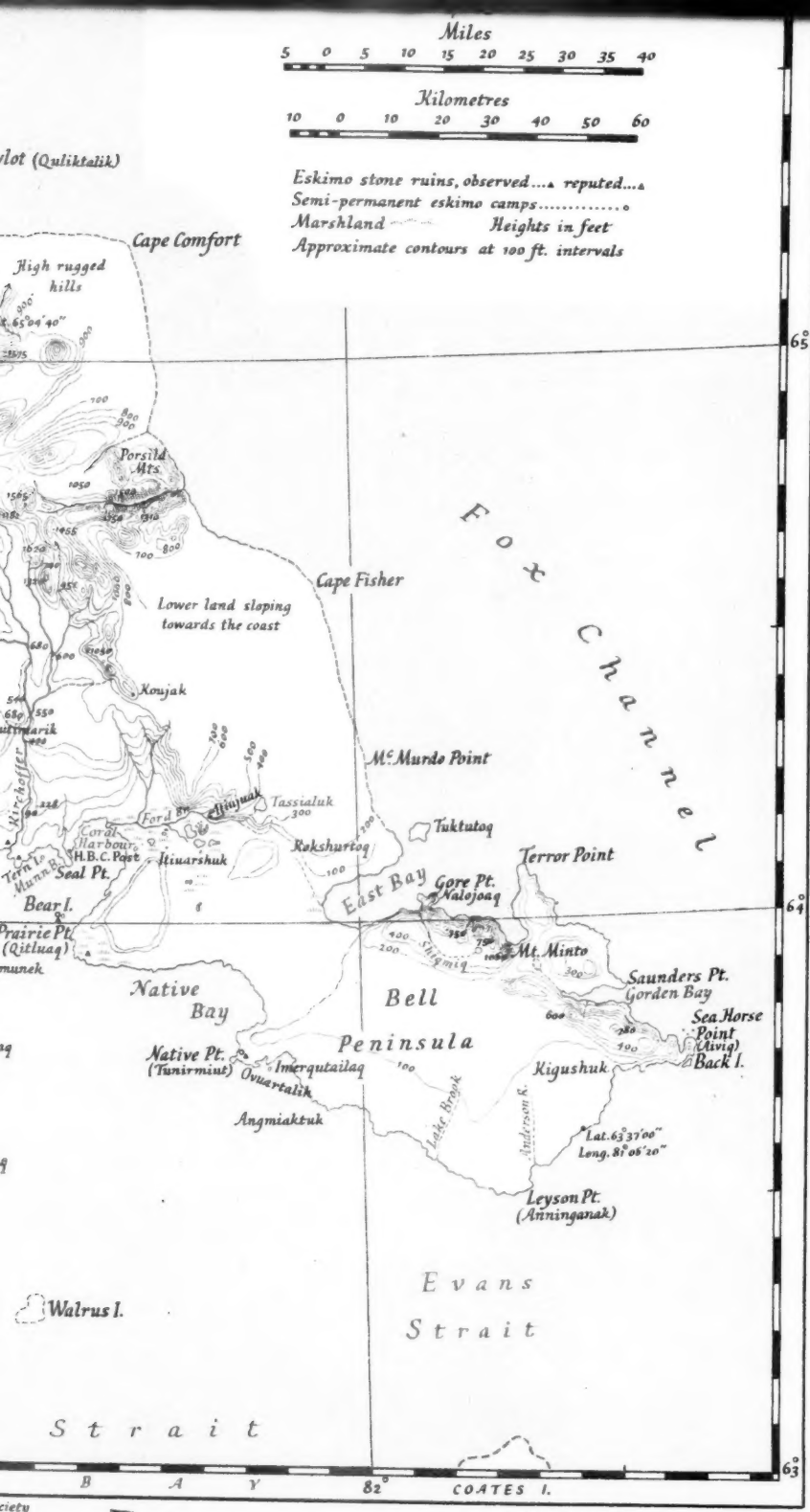

SOUTHAMPTON I. CANADA
T.H. Manning